

Flight, January 13, 1912.

FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

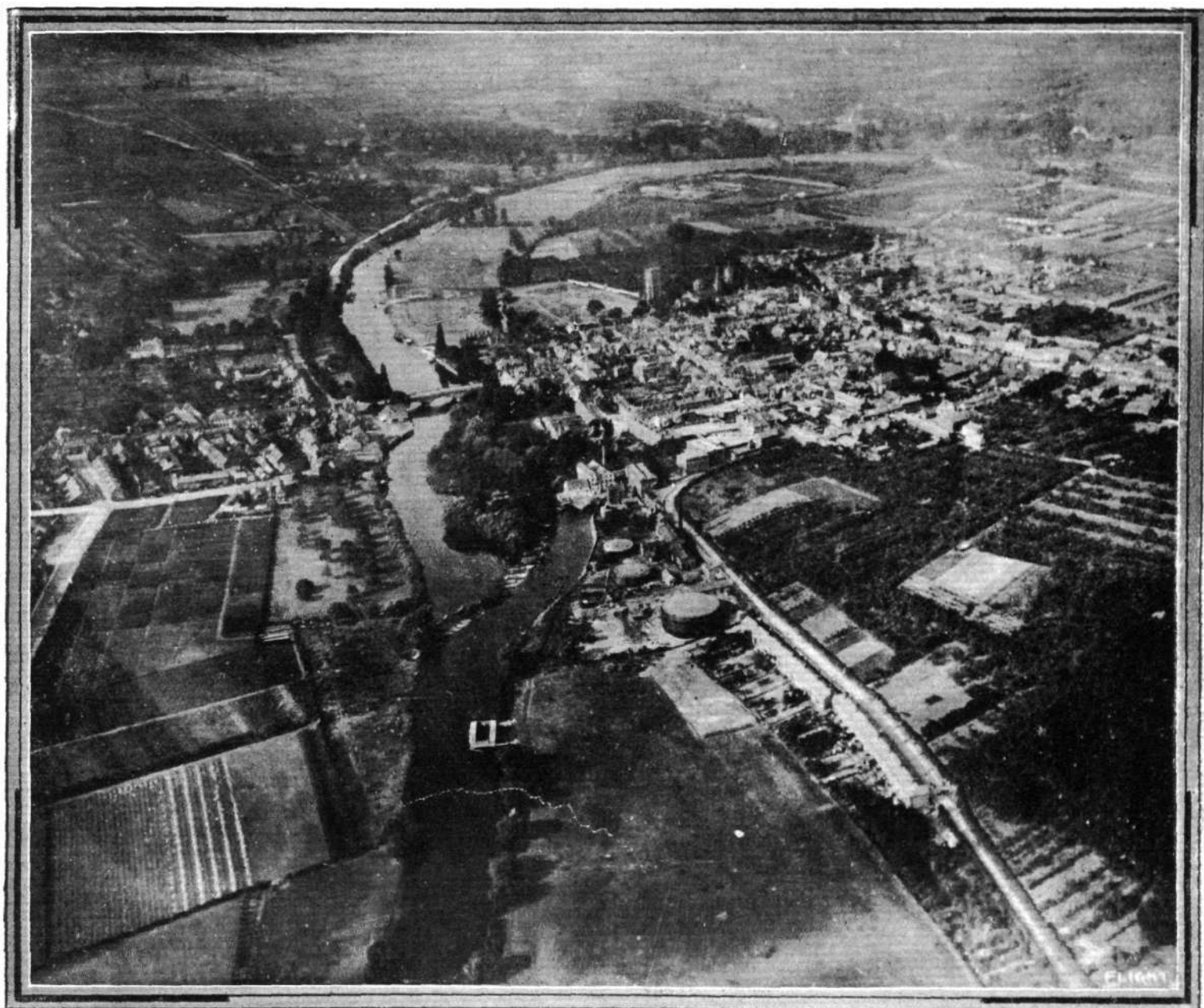
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From Consul Gustav P. Stollwerck, who has just been awarded the Mortimer Singer Cup, we have received a series of very interesting photographs secured during trips in his balloon "Dunlop," one of which we reproduce above, and others will duly appear in these pages shortly. Our picture shows the district of Evesham, it being secured on August 13th last during a balloon voyage to Newtown in Wales, a distance of 165 miles, with four passengers, the start being made at 3 a.m., and Newtown reached at 12.5 p.m.

EDITORIAL COMMENT.

Aviation in the Services.

Although the prevailing attitude of the Government towards aviation in the past has been in the main one of apathy—or at least apparent apathy—an attitude which we are glad to say seems to be passing in favour of one much more in consonance with what we believe to be the need of the moment, it by no means follows that the same want of interest has been manifested by the officers of the Army and Navy to whom we shall have to look in the future to supply us with the *personnel* of our aerial forces. A very large amount of quiet study has been expended upon the manifold problems which the coming of the air-craft has introduced for solution by commanders in the wars of to-morrow. Of these problems that of the most suitable type of machine and of the details of its use—what, in fact, we may term the mechanical problems—are by no means the least. It is a sign of the times that the Service publications are devoting a great deal of space and attention to the subject of military aviation and to discussion of the new situations which must arise on the battlefields of the future in consequence of the employment of the new arm. Many of these discussions and the conclusions at which they arrive are of little interest to the lay mind, because they are highly technical in character and require special knowledge for their assimilation. On the other hand, much that is appearing in these journals is of the deepest interest to the ordinary citizen, especially if he should, as he ought, take more than a passing interest in the details of how battles are fought, lost and won.

We have noted the deep concern with which our officers regard the use of the air-craft in war, and by air-craft we naturally include both aeroplane and dirigible. That this concern does exist, and that the *personnel* of our fighting services is fully alive to the importance of the subject is amply borne out by the recent discussion which took place at the Royal United Service Institution, and which was reported in the columns of **FLIGHT**. That discussion related to the mechanical aspects of the use of air-craft in war. In the January issue of the Army Review, which is published under the direction of the Chief of the Imperial General Staff, there appears the text of a lecture on "Military Aviation," delivered by Capt. H. R. M. Brooke-Popham, of the Oxfordshire Light Infantry, at the Staff College, which is of the greatest possible interest to all who have given more than a little thought to the subject. The author finds himself generally in agreement with the school of thought which believes the true *role* of air-craft to lie in reconnaissance, though he lays it down that a struggle for the command of the air will, no doubt, be a feature of the next great war. One side, says Capt. Brooke-Popham, is sure to start with an advantage in the numbers or quality of its machines, or in the ability and *moral* of its pilots, and it is inconceivable that the latter will rest content with a mere exchange of information, and not make determined attempts to prevent the enemy doing any aerial reconnaissance whatever. Again, there may be occasions on which one side has little to gain by reconnaissance, but has much to conceal, and in such a case the commander will no doubt allot to his aeroplanes the protective task of keeping off and destroying the hostile air-craft. What this will mean requires very little imagination to foresee, but, as he says, quoting the words of a well-known officer: "The particular form of death that falls to the lot of the reconnoitring officer is no concern of the commander."

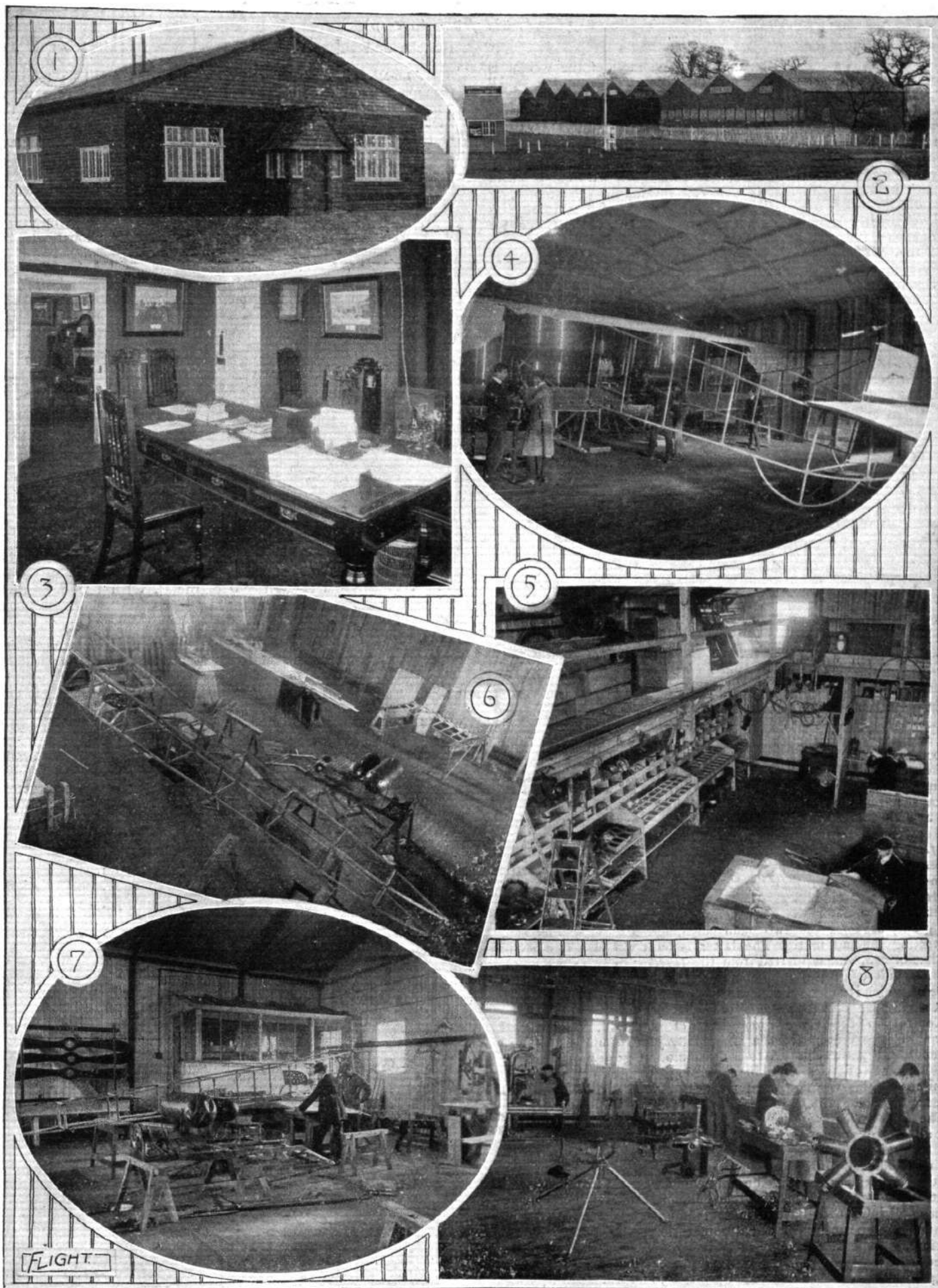
COMMENT.

Speaking of the effect of the aeroplane on military operations the author goes on to say "it is impossible to forecast exactly the effect that aeroplanes will have on war, but a few general tendencies may be indicated. Aeroplanes will be of greater value in strategy and grand tactics than for minor tactical operations; small bodies of troops may be concealed from them, but not large masses or marching columns; and an aeroplane is almost certain to be able to go out on any day, but not at any particular time of day. River lines, hills, and covering troops are no longer a screen for the concentration or for the movements of an army. A General will be able to have personal interviews with his reconnoitring officers and will be able to send off members of his own staff to see the situation or even to go out himself."

Capt. Brooke-Popham does not appear to believe in the efficacy of rifle or gun-fire against hostile air-craft. According to the authorities of the Hythe School of Musketry, it would be a sheer waste of ammunition to use rifle fire against an aeroplane at a height of 3,000 ft. According to Italian reports, aeroplanes in Tripoli, even when flying at the comparatively low altitude of 1,600 ft., have not been damaged by rifle-fire. As for high-angle gun-fire, the author does not think much of its potentialities against fast moving aeroplanes, so that the only method of preventing the hostile aeroplane from gaining the information it has set out to obtain is by means of a counter attack by friendly air-craft. War has ever been an ugly business, and every progressive invention that can be applied to its principles and use tends to make it even more nerve-racking and horrible. We seem now to be rapidly getting towards that stage of development when something of the nature of what H. G. Wells conceived in his "War in the Air" is no longer a remote possibility but a very strong probability.

Of the possibilities of an aeroplane as a bomb-dropping device, Capt. Brooke-Popham expresses himself very cautiously, and here again he emphasizes the opinion that it is in reconnaissance that air-craft will find their chief value. Something, he thinks, might be accomplished by the moral effect of dropping a bomb into a bivouac by night, or even by letting loose a few star shells, certainly on troops who have been fighting for two or three days on end. His well-thought-out conclusions upon the future of British military aviation are worth reproducing, and are deserving of the deepest consideration by those who guide our policy. This is what he says:

"In the British temperament are to be found all the natural characteristics essential for the successful aviator. We have a well-equipped air-craft factory with skilled engineers and mechanics, a body of scientists is now studying the question of flying theoretically, and there is any amount of ability and zeal among the officers of the Air Battalion, who, under the most discouraging conditions, have been risking their lives daily on antiquated machines; and behind them there are numerous aspirant officers, capable of making good pilots. The mechanical ability and engineering resources of this country, once developed, are capable of making aeroplanes and engines as good as or better than any made abroad. With this great store of potential energy, we have all the elements necessary for producing an Air Corps unsurpassed by that of any other nation. But we may not have much time before us, and it behoves us all the more to make the most of the opportunities we now have."



ENTERPRISE AT HENDON.—A group of photographs showing the ever-increasing organisation of the Grahame-White Aviation Co., Ltd., at the London Aerodrome. 1. Exterior of offices. 2. The works and school hangars. 3. Interior of Mr. Grahame-White's office. 4. Inside one of the school hangars. 5. The stores. 6. Wood-working shop. 7. Erecting shop. 8. Engineer's shop.

PARIS AERO SHOW.

(Continued from page 9.)

Besson Monoplane.

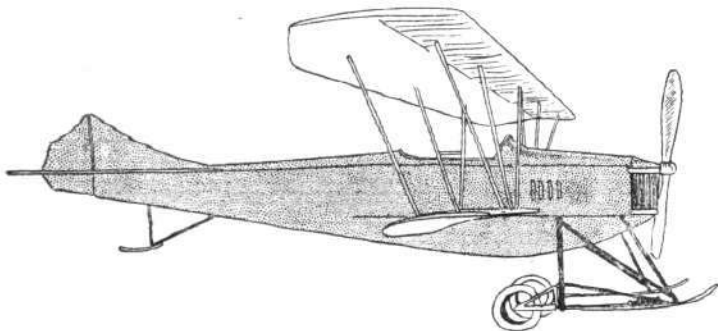
THIS interesting monoplane, in which most of the weight is disposed below the supporting surfaces, is of the tail first or "canard" type, so constructed in order to make it more suitable for the attachment of floats for hydro-aeroplane work. The pilot is seated in the fuselage below and slightly in advance of the wings, in which position he can gain a good view of what is beneath him and if necessary drop explosives with a considerable degree of accuracy. Ailerons are employed for lateral balance, these being governed from a control almost identical with that of the Voisin Canard. The motor, an Aviatik Rossel of 70-h.p., is arranged to the rear of the machine on a level slightly below that of the wings, and drives a Chauviere propeller of 2m. 50 diameter and 2m. 45 pitch.

Principal dimensions, &c. :—

Length ...	25 ft.	Weight ...	725 lbs.
Span ...	38 "	Speed ...	55 m.p.h.
Area ...	286 sq. ft.	Motor ...	70-h.p. Aviatik Rossel

Clement Bayard.

THE all-steel two-seater biplane that was on view at the Clement-Bayard stand is a direct descendant of the monoplane with which they have been carrying out successful experiments for some time past, and which caused quite a sensation by its appearance in



CLEMENT BAYARD

The Clement-Bayard tractor biplane.

flight over the Grand Palais on one of the days when the Salon was in progress.

The main body of the machine is roughly of torpedo shape, being of pentagonal section in front and in the region of the pilot's and passenger's seats, and from that point to the tail dwindling to triangular section. It is covered in throughout its whole length by metal sheeting in front, and by fabric at the tail end.

The main planes, of modified Nieuport cross-section, are attached and braced to a central tower of steel tubing, constructed integral with the fuselage, from which they may be readily detached to facilitate terrestrial transportation of the machine from place to place. The top plane is longer in span than the lower one by about 6 ft., and lateral balance is maintained by warping them synchronously. Steel is chiefly employed for the construction of the landing gear—wood being only used for the two main skids, and for the smaller skid protecting the tail unit. The latter is built up of a number of laminae of ash, and supported from the fuselage by two steel tubes. The tail unit comprises a horizontal stabilising surface, to the back edge of which is hinged the elevator.

A small triangular fin precedes the unbalanced rudder.

Control in the three dimensions of elevation, balance and direction is operated from a universally jointed upright column surmounted by a wheel. A to-and-fro motion governs the ascent and descent of the machine, rocking the column laterally manipulates the warping, and rotation of the wheel effects the steering to right and left.

The location of the three controls on one column and the fact that all control wires are carried from a point below the fuselage, has the effect of giving the interior of the pilot's cockpit an unusually clean appearance.

Other interesting exhibits on this stand were an extremely well constructed nacelle for a dirigible balloon, fitted with a pair of water-cooled Clement-Bayard motors and a clever apparatus for measuring the permeability of balloon fabric.

Principal dimensions, &c. :—

Length ...	32 ft.	Weight	880 lbs.
Span ...	36 ft.	Speed	56 m.p.h.
Area ...	308 sq. ft.	Motor	50-h.p. Clement-Bayard.
Price ...	£1,120.		

Ponche and Primard.

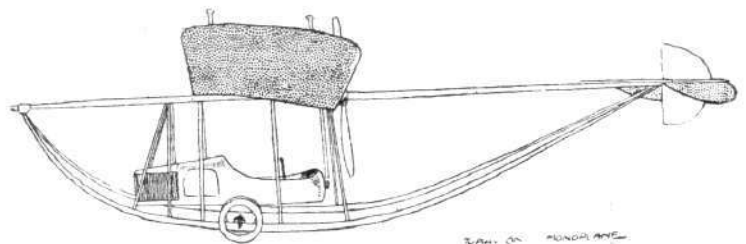
ALL-METAL construction is the chief feature of the interesting monoplane exhibited on Stand No. 10. A single steel tube, about 3 ins. in diameter, extends from the nose to the tail, and forms the backbone of the machine. Coupled to this tube, to form a structure of triangular section by means of shorter steel tubes, are long ash skids, which run from end to end.

These skids as can be seen from the accompanying sketch, extend for a considerable distance in front, thus eliminating any possibility of turning over on landing.

Both pilot and engine are located beneath the wings in a little body, which has all the appearance of a small runabout without wheels.

The wings are essentially novel, being constructed throughout of metal. Both front and rear booms are of steel tubing and on these are strung formers of 1 mm. steel aluminium. These are surfaced on the underneath with aluminium sheet $\frac{1}{8}$ -inch thick.

No surfacing has as yet been applied to the top surface for



TUBAVION MONOPLANE

The Tubavion monoplane constructed by Messrs. Ponche and Primard. The chief characteristic of the machine is that it is constructed entirely of metal, with the exception of the landing skids.

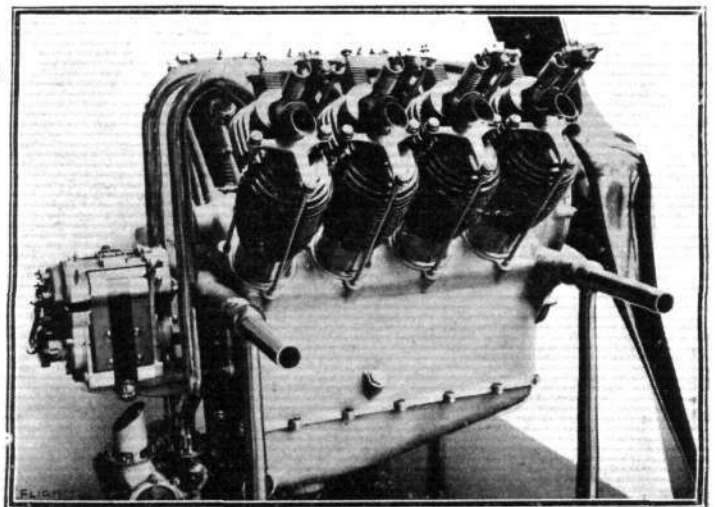
the reason that it is thought that the gain in the efficiency of the wings would not be sufficient to compensate for the extra weight involved. The rear wing booms are assembled in an aluminium casting which pivots about the main longitudinal tube of the fuselage. The propeller, too, revolves about this tube, being driven from the engine at reduced speed by means of chain transmission.

The tail comprises a rectangular lifting plane with two semi-circular elevators hinged to its back edge and a semi-circular unbalanced directional rudder, the whole unit being constructed from aluminium sheeting.

Principal dimensions, &c. :—

Length ...	27 ft. 6 ins.	Weight	660 lbs.
Span ...	32 ft.	Speed	48 m.p.h.
Area ...	220 sq. ft.	Motor	35-h.p. Labor-Aviation.

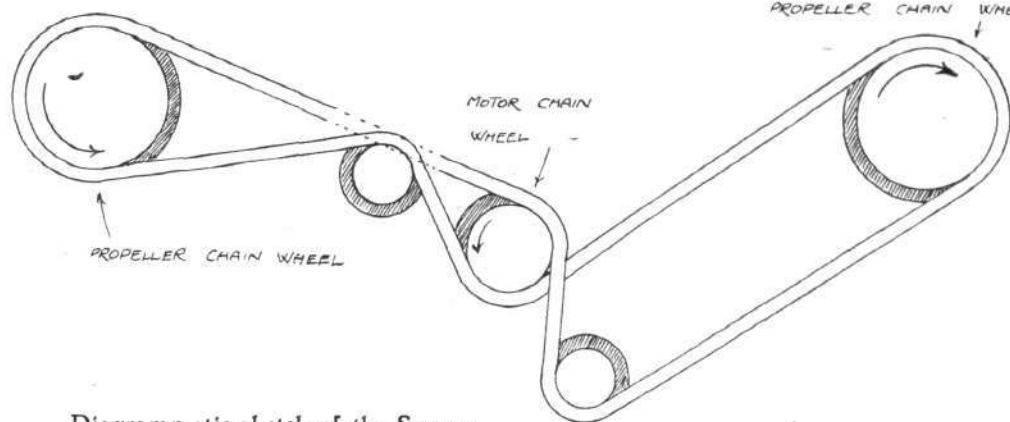
Price ... £640.



The 8-cyl. 35-h.p. Renault motor at the Paris Aero Salon.

Ratmanoff and Co.

THIS stand was undoubtedly engaged for the purpose of exhibiting Normale propellers, which, for excellent workmanship and thrusts given, have earned for themselves an enviable reputation on both sides of the Channel. However, it is doubtful if the lay section of the visitors at the Salon paid much attention to their merits in view of the superior attraction of the Blériot 100-h.p. aero-limousine, built to the order of M. Deutsch, which was on exhibition on the same stand. As regards a description of this machine, readers have already been told in these pages of its principal features, and so a brief description should suffice. Under the main wings is disposed a miniature square-shaped body, beautifully carried out by Rothschild, Paris, and which seats four passengers. Its interior is padded with pneumatic cushions, to minimise any shocks which might result from heavy landing. The pilot, who sits immediately in front of this closed-in body, has before him the customary *cloche* and footbar of the Blériot, while to protect his face from the rush of air is provided a conical shield



Diagrammatic sketch of the Savary single-chain transmission.

of mica. Elevation and depression of the machine is controlled by a single cambered surface mounted some 10 feet in front of the pilot on outriggers. Propulsion is derived from a Gnome engine of 100-h.p., directly coupled to a Normale propeller, which propulsive group is situated above and to the rear of the body. The tail unit comprises two surfaces, a vertical surface with which the steering is effected, and a horizontal cambered tail, unconnected with the

elevator, and set at a much less angle of incidence than the main planes, for the purpose of arriving at some measure of natural longitudinal stability. The chassis preserves the same Blériot characteristics, that of the deformable triangle at the lower point of which the running wheels are applied.

Savary.

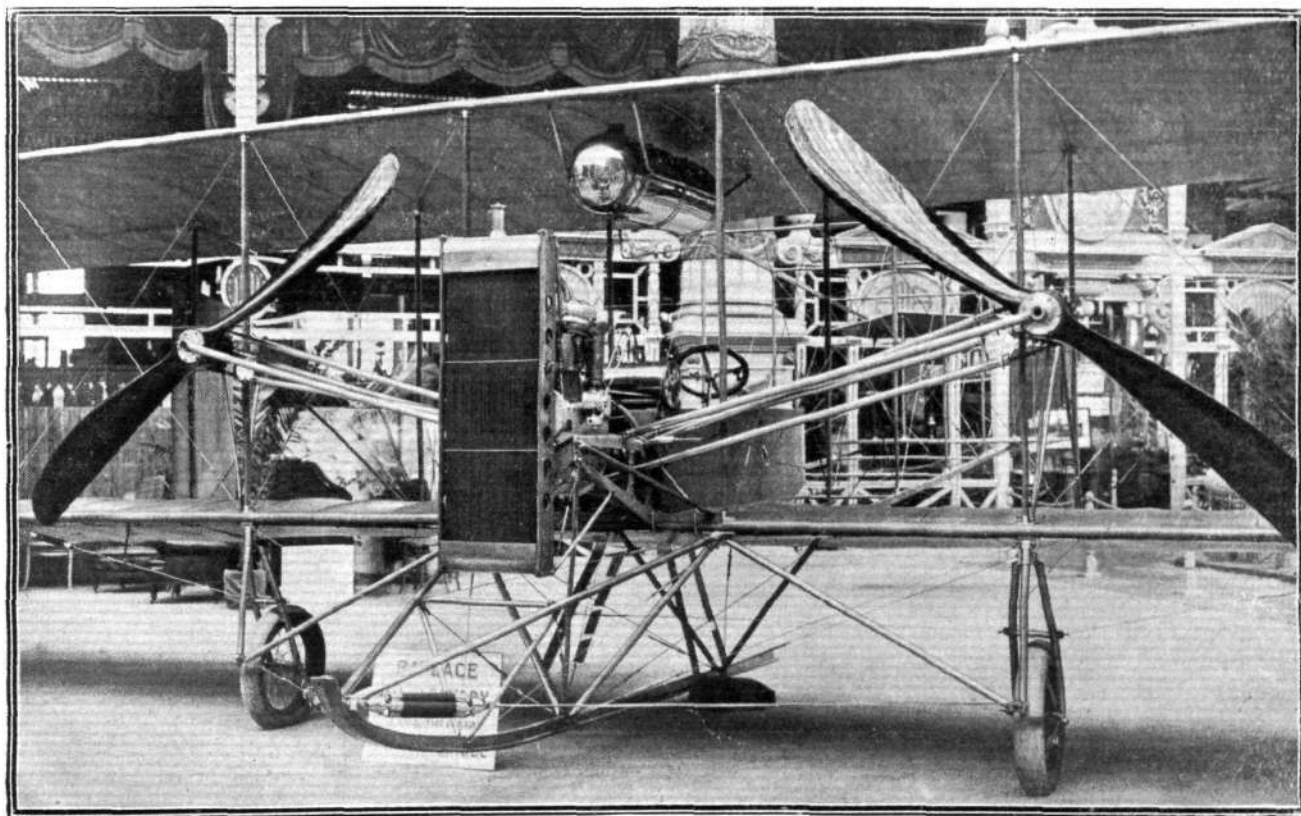
THE solid-looking biplane, representing the Savary firm, possessed an enhanced interest on the score that it was one of the machines to fulfil the difficult conditions of the military trials at Rheims. Its *cellule* has a span of 46 ft., and apart from the fact that the stanchions are of steel tubing, this section of the whole machine presents little departure from standard practice. The surfacing is treated with some kind of wax preparation. Propulsion is obtained from two tractors, driven by a single chain in opposite direction by a 70-h.p. Labor-Aviation motor.

The importance of the single-chain transmission can be readily seen, for should it by any misfortune break, both tractors would be thrown out of action at the same time. Indeed, the writer was informed at the stand, that the system had been tested by breaking the chain in mid-air with no uncomfortable results; although the information as to exactly how this was effected while in flight was not forthcoming.

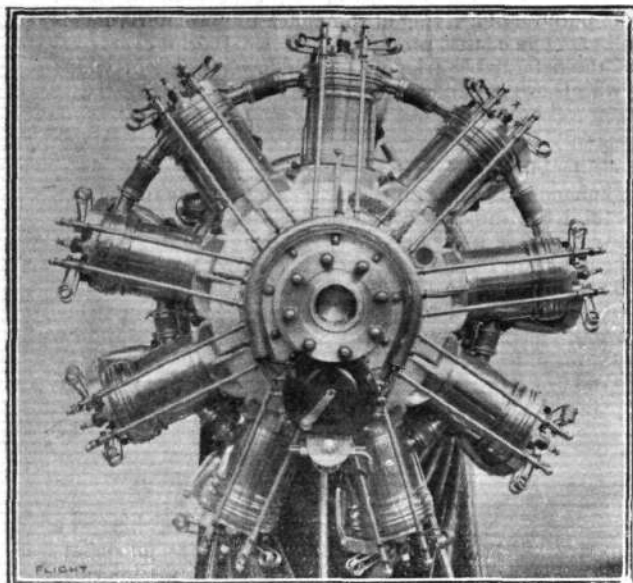
The landing arrangements consist of a central skid of ash, rigidly supported from the *cellule* by struts of steel tubing and a pair of wheels, disposed on either side of this skid. These wheels are hinged to the body of the machine at the upper extremities of the forks, to which they are attached, and under the influence of a landing shock, disappear towards the rear, each against the action of four shock

absorbers arranged "in parallel."

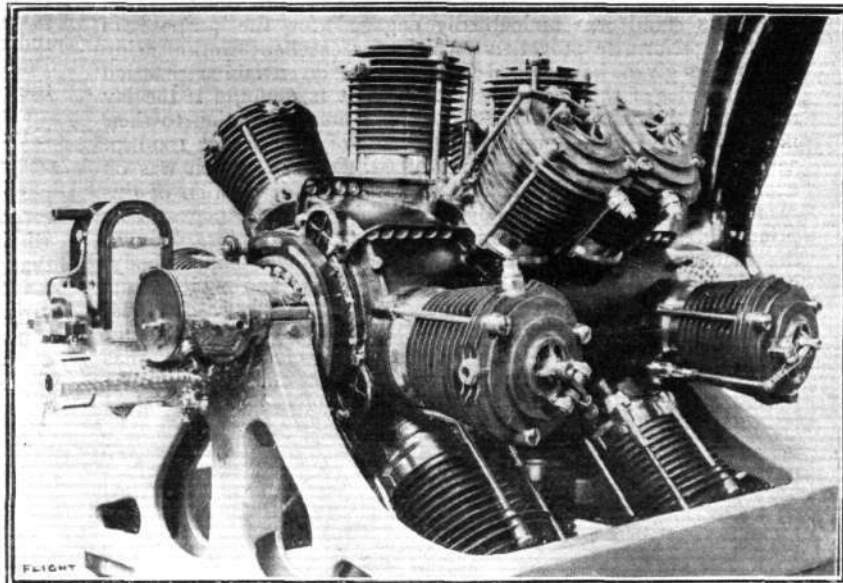
At the tail end of the machine are disposed two roughly-pentagonal superimposed flat surfaces, flying point foremost, which serve the double purpose of stabilizer and elevator. There is no directional rudder in the tail unit, this function being performed by a system of two vertical panels arranged at each end of the *cellule*. In straight-line flight these fly out and give no resistance, but when a turning



The Savary biplane, showing the landing gear and the disposition of the two tractors.



The 9-cyl. 110-h.p. Salmson motor at the Paris Aero Salon.



The 16-cyl. 130-140-h.p. Burlat motor at the Paris Aero Salon.

movement is required they are swung round and closed up on the side to which the desired turn is to be made. Balancing laterally is effected by ailerons. A boat-shaped body accommodates pilot and passenger, the former of which has control of the lever, a vertical column with a horizontal wheel arranged at its upper end. Control is manipulated in exactly the same manner as that in force on the Clement-Bayard biplane.

Principal dimensions, &c. :—

Length ...	36 ft.	Weight ...	1,320 lbs.
Span ...	46 "	Speed ...	62 m.p.h.
Area ...	572 sq. ft.	Motor ...	70-h.p. Labor-Aviation.
Price ...	£1,040.		

The Sloan Biplane.

It will be remembered that at the last Aero Show in Paris appeared a biplane of the engine-in-front type of which the top plane was considerably arched. In the machine that the Sloan firm are exhibiting this year this arching of the upper planes is much less pronounced, and its extremities are not carried down to meet the lower planes, as was the case with last year's models. The central unit of construction of the machine takes the form of a fuselage built on the conventional box-girder principle, at the front end of which is disposed the power unit—a 100-h.p. Gnome engine and Chauviere propeller. The fuselage in the region of the pilot's and passenger's seats is covered over with a thin veneer of bird's-eye maple. For the rest of its length it is uncovered. Lateral balance is arrived at by the use of ailerons, which are fitted to the top plane only, which has a span of 43 ft. The lower plane spans a little under 30 ft. As regards this landing chassis, that fitted is of the Farman type, consisting of two skids,

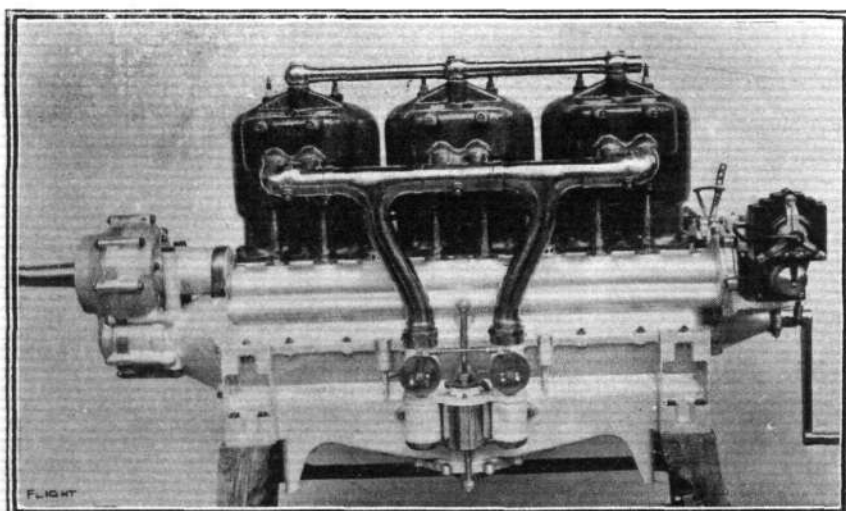
each of which is furnished with a pair of flexibly-sprung swivelling wheels. For the past year trials of the earlier type of machine have been taking place both at Issy and Juvisy, and it is on the result of these tests that the design of the present machine is based.

Principal dimensions, &c. :—

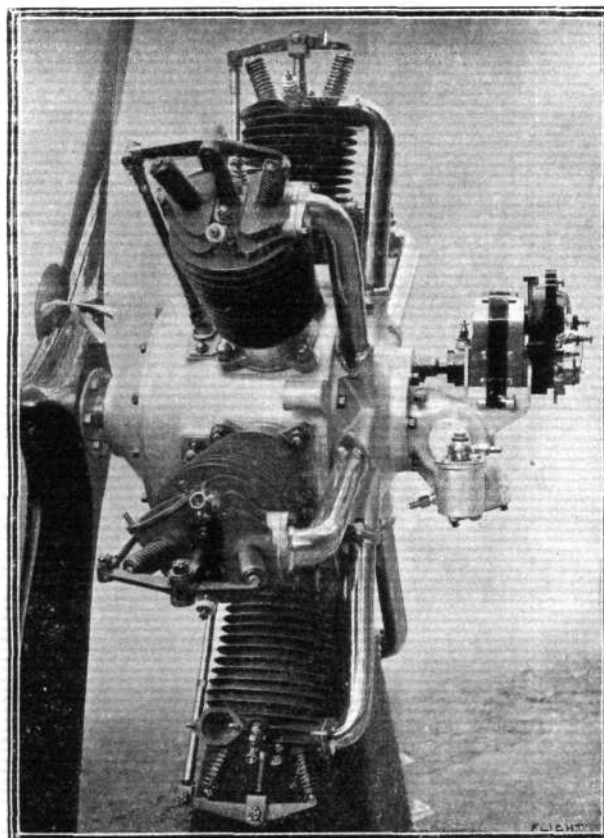
Length ...	32 ft.	Weight ...	1,200 lbs.
Span ...	43 ft.	Speed ...	58 m.p.h.
Area ...	540 sq. ft.	Motor ...	100-h.p. Gnome.
Price ...	£1,400.		

Sotinel, Guerin, and Corneloup.

ON this stand was shown a monoplane, the wings of which are constructed on a system claimed to render the machine automatically stable in a lateral sense. Each wing is divided at about one-third of its length from the tip, and the end portion is allowed to pivot about its main boom in a manner very similar to the early Blériot method of controlling lateral balance. Both wings are assembled



The 100-110-h.p. Chenu motor at the Paris Aero Salon.



The 7-cyl. 90-h.p. R.E.P. motor at the Paris Aero Salon.

together to form a single unit, which is pivoted to, and from which is suspended, the fuselage.

Should a gust cause the right-hand wing to rise relative to the rest of the machine, the *aileron* at the end of that same wing is automatically set at a negative angle of incidence, which immediately returns the wing to its normal position. Apart from the peculiarity of the wing construction, the machine possesses no departures from conventional design, sufficient to say that the main body is of the ordinary box-girder type, the tail surface is flat and purely directional, and the landing gear is of the A-type wheel and skid order.

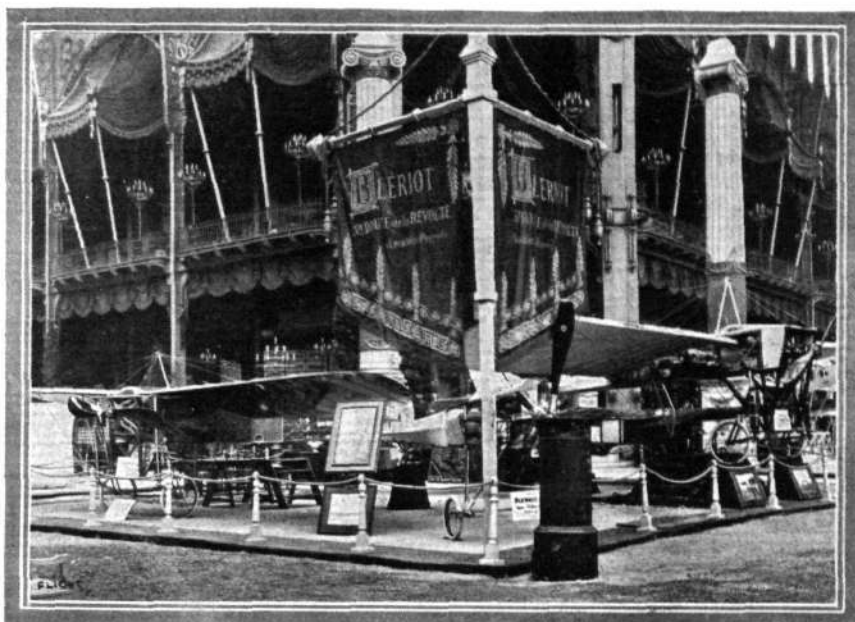
Principal dimensions, &c. :—

Length	33 ft.	Weight	1,000 lbs.
Span	36 "	Speed	45 m.p.h.
Area	231 sq. ft.	Engine	50-h.p. Clerget.

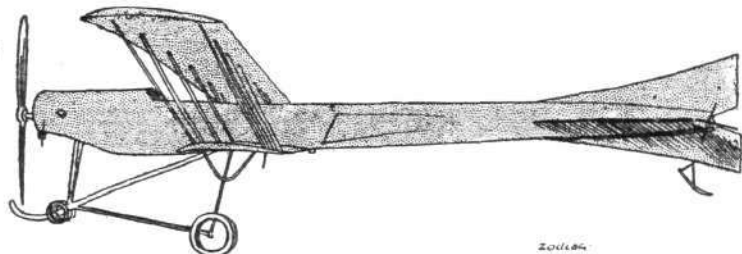
Zodiac.

THE Société Zodiac is yet another of those firms who have, during the past year, adopted the fuselage and the engine-in-front position on their biplanes. In its superficial appearance, their machine closely resembles the Antoinette, with the exception that a staggered biplane *cellule* is employed for sustaining in place of the latter's single spread of wing. Throughout its whole length the main body is of rectangular section, being constructed on the conventional lattice-girder principle, and is covered in with fabric.

At its rear end is arranged a horizontal *empennage*, the elevator flaps, and the directional



The Blériot stand at the Paris Aero Salon, showing the extremely neat 50-h.p. Gnome-engined racer in the centre. The clean design of the landing chassis is the chief feature of this machine.



Side view of the Zodiac biplane.

rudder. Even as regards its landing chassis, the machine preserves its resemblance to the Antoinette. In its springing, how-



United Kingdom, Not Great Britain.

IN a statement issued by the War Office regarding the proposed test of military aeroplanes, it was stated that the second set of prizes would be "open to British subjects for aeroplanes manufactured wholly in Great Britain except the engines." A correction has now been issued that the expression "Great Britain" was inadvertently used for the "United Kingdom."

Aviation at London University.

On Friday, February 2nd, a course of thirteen lectures on The Theory and Practice of Aviation will be commenced at the University College, Gower Street, London, W.C., by Mr. Archibald R. Low, M.A. (Edin.), B.A. (Cantab.). Mr. Low is well known as a Chief Engineer of the Aviation Department of Messrs. Vickers Ltd., and holds the Royal Aero Club's pilot certificate. The lectures will be given on Fridays, and begin at half past five, the fee for the course being two guineas. The first lecture will be an introductory one dealing with the present state of aviation, with special reference to the choice of future lines of progress. Lectures I and II will deal with the experimental basis of the laws of the resistance of the air and bodies moving therein, Lectures III to VI with the characteristics of an aeroplane, weight, head resistance, maximum rate of climbing, &c. Lectures VII to IX will be on the subject of propellers. Lecture X on the choice of a motor, and the last two lectures will be on the application of the aeroplane to cross-country flying, instruments, &c., finishing with a few notes as to the ideal machine. Full particulars may be had from the Secretary of University College.

A Blackburn over the Home Fleet.

A FINE flight was witnessed at Weymouth on Sunday when Lieut. Spencer Grey, in the face of a gusty wind, rose from Lodmoor on his Blackburn monoplane, and flew out to sea. He circled over the ships of the Home Fleet, much to the delight of the sailors, and then skirting the town of Weymouth, returned to his starting point, landing close to his hangar.

ever, it employs a different principle. From the axle uniting the two wheels proceeds a vertical mast of steel tubing, which is further stayed thereto by diagonal tubes on either side. From the upper extremity of this mast, the remainder of the aeroplane, consisting of the main body and the sustaining surfaces, is virtually slung, this being carried out by means of a series of brass-capped cotton-covered shock-absorbers. A substantial skid, shaped like a hockey stick, extends forward to protect the propeller. Balancing is controlled by the employment of ailerons.

Principal dimensions, &c. :—

Length	...	38 ft.	Weight	...	990 lbs.
Span	...	50 ft.	Speed	...	60 m.p.h.
Area	...	352 sq. ft.	Motor	...	50-h.p. Gnome.

Price £1,120.



A Monoplane in the Solent.

MR. F. B. FOWLER, who has been making some good flights at Eastbourne, had a pretty exciting time during his first attempt at a cross-country sea flight on Monday last. He set out from Beaulieu to fly to Eastbourne, but as he was nearing the Solent he ran into a bank of thick fog and found the wind very trying. He therefore turned to go back, but the wind forced him down until the machine touched the water when it turned a complete somersault. Fortunately he had provided himself with an airbag and so was able to keep afloat until picked up by a Government launch and landed at Calshot Castle where he was attended to by the coastguards. The Blériot machine was towed ashore considerably damaged.

Flying at Aldershot.

THE new army aeroplane showed up well in the test carried out on the 3rd inst. After taking his seat, Mr. De Havilland quite easily started the engine and within ten seconds the machine was in the air. It was noticed that the silencing of the engine had, if possible, been still more improved, while the whistling caused through the air rushing through the radiator had been overcome.

Mr. Cody having had his new machine smashed up, has had his old "Cathedral" brought out and fitted with three more seats, so making it a five-seated 'bus. He has also installed a 100-h.p. Austro-Daimler engine, which during its preliminary trials on the 8th inst., enabled the machine to show a clean pair of heels to some of the Army flyers. Mr. Cody intends fitting up a platform beneath the machine on which a man may lie fully extended and manipulate a machine gun, covering everything in front of and below the aeroplane.

Besides the Cody flyer, several of the Government machines were in the air at Aldershot on Monday, Captain Burke on a Farman meeting with an accident about the same spot where he once before came to grief. In turning the machine was caught by a gust of wind and brought down, but the aviator fortunately escaped with minor injuries to his leg.

By MERVYN O'GORMAN.

In all aeronautical work, long distance flight is a question of *not* increasing the load of fuel to excess. It is not quite common knowledge that after the carburettor has been tuned up to the finest possible point it is still possible to get waste of petrol by apparently insignificant matters of handling the aeroplane, such as flying at the

3. These may be called the available speeds. Theoretically more range can be obtained even from these aeroplanes by flying yet slower with the engine at full power and the aeroplane "cabré." Also, matters that are still considered quite small—as such things are viewed at present—may quite well account for a loss or gain of 5 or 6 per cent. of the upper limit.



conceive a case where an increase of the size of the engine might bring more fuel economy, *i.e.*, where too small an engine had previously been raced at an inefficient speed of rotation, but normally this should be a rare occurrence to-day, since the safety of the large margin of engine power is recognised.

The fact is only worth mentioning because the result of practical motor car experience is likely to be a temptation to use the smallest engine possible where fuel is to be saved, and to run that at the speed which has previously been determined by experiment on the bench and by adjustment of the carburettor to be the most economical one in petrol.

Although this may be justifiable from a limited point of view, it is necessary to remember that even if the competition regulations do not call directly for a large engine by insisting on a minimum rate of climbing, there are atmospheric reasons for keeping a large margin of power.

6. When a smaller engine can be used we can generally save in weight thereby, which raises the question whether the flight speed of greatest economy for one weight is not different from the economical speed with another weight on the same aeroplane. The chart shows by curve 1 that such is the case, since the effect of a lighter loading is to shift this curve bodily to the left across the chart, thereby moving the point Q to the left also.

It will be useful for present purposes to keep clear of the considerations introduced by supposing the competitor to fly to a great height, either for the purpose of coasting as much as possible or to find favouring winds. When a pilot does this, he may effect a certain amount of flying without appreciable use of fuel in exchange for the energy expended in climbing. To discuss this consideration is distinct from the matter now in hand, but it presents no particular difficulties when we remember that it is analogous to the "constant acceleration" system for electric railway services (discussed by Parshall, and also in P. Dawson's monumental tome on this subject).

7. Even when the entire flight is supposed to be executed at one level, the best engine to adopt, the best speed to adopt, the best angle of incidence of main planes to adopt, all become more and more difficult to decide unless some such drawing as this chart is used to analyse fairly exhaustively the conditions of working of the particular aeroplane. This apparent complexity might wrongly decide the entrant upon the simple course of trusting to luck, which unfortunately and unavoidably enters into other aspects of all competitions.

8. Having said thus much to show that the curves may be of use, it is as well to say briefly how they can be got for any aeroplane.

9. **To Make the Chart.**—As a basis, it is, of course, necessary to have the curve of lift and drift at all angles from zero to 20° of the particular wing shape to be used. Much assistance towards this, the first and most elementary necessity for aeroplane design, is found in the fine series of such curves given in "La Resistance de l'Air et l'Aviation," but the actual wing curve used should itself be submitted to test in the wind tunnel, either at the N.P.L. or at one of the technical colleges. The outcome of this experiment is the curve No. 1, marked "plane resistance" in the chart. On it are marked the angles of incidence required at the various speeds to secure lift enough to support the aeroplane, supposed to be of constant weight.

10. **Body Resistance.**—After this, it is necessary to plot the curve 3, obviously a close approximation to a parabola (though it looks straight) giving the body resistance of the actual fuselage to be used at the various possible speeds of flight. It is laborious, but otherwise easy, to get the curve which represents the summation of the resistances of the skids, wheels, struts, wires, rudder, body, pilot's head and shoulders, and any exposed part other than the planes. This is curve "body resistance," and if the tail is a lifting tail it may be separately plotted, just as curve 1 was plotted and added in with body resistance.

11. **Horse-power Required and Available.**—Next, these two curves, Nos. 1 and 3, are added to give the curve 4 "total resistance." After that we multiply the speed at each abscissa by the ordinate of "total resistance" at that abscissa and get thereby the curve 5 of "horse-power required."

Then, whatever engine is to be used must be tested at a range of speeds to obtain the curve of "horse-power available" (*viz.*, at the number of engine revolutions denoted by the speeds of travel—allowance being made for the slip which the propeller was designed to have at these speeds).

This completes the chart, with the exception of the gliding angle curve, which is the same as the "total resistance" curve but re-plotted to make it easier to see the exact point of minimum and the value of the gliding angle at various speeds.

12. We now have a very complete exposé of the qualities of the aeroplane and can trace by mere inspection the general effect of varying the things that are usually constant once the aeroplane has been built.

For the best performance on a minimum quantity of petrol we

require to use a minimum number of horse-power-hours on that performance. If the test is for duration, then the number of *hours* must be a maximum, and two reasons in this case conduce to make us desire that the "horse-power required" shall be as small as possible. Reference to the "H.P. required" curve (5) shows that this occurs at say 70 ft. per second, or about 47 m.p.h.

13. If one were building a new aeroplane and desired to improve on this, one plan is to shift the "total resistance" curve (4) by some device so that it shall be lowered at the flight speeds to be used. There are several means of doing this. The body resistance curve (3), which is one of its components, can be lowered further if possible by the drastic omission of the unnecessary, and by clothing to a fair shape the necessary parts such as struts and wires. To economise on head resistance is a well-known difficulty, and is not to be enlarged upon here. Then it is desirable, as pointed out in paragraph 5, to move the "planes resistance" curve (1) either downwards, or, what comes to the same for present purposes, more to the left. We see that at the point of minimum horse-power, or 70 ft. per sec., the planes are cabré, the angle being over 11° .

14. **Angle of Incidence.**—If the angle could be brought to $6\frac{1}{2}^\circ$ or 6° there would be a clear diminution of the h.p. required at that point. One way of doing this is by increasing the sail area. This, obviously, can be put in elementary terms:—The weight to be supported is constant, therefore the "M.V." of the air that is necessary to support it is constant, and since diminishing the angle diminishes the downward component of the air's velocity, we must compensate for that by increasing the mass of air moved. The simple way of doing this is to use larger planes—reciprocally, if we use larger planes the angle will be diminished, and so we arrive by the simplest possible stages not precisely to a confirmation of the view that larger aeroplanes are slower, but that increasing the wing area may help within limits to diminish fuel expenditure. By whatever amount the plane area is increased, by so much will the angle be altered, and accordingly the curve in question will be moved to the left. The user of the method can re-plot for himself.

15. If now we diminish the weight carried, the same reasoning leads to the same conclusion, the curve of "planes resistance" is moved to the left. The effect of both is that the horse-power required for the flight is less. The particular aeroplane, not a bad one, whose chart is here given, by no means represents the universal state of affairs. Instead of flying with the main planes at an angle of 11° during the most economical flight, a certain well-known aeroplane will be found at an angle of 8° . The former aeroplane may be good, but it is, at any rate, susceptible of improvement. In such a case as this, a 10 per cent. diminution of the loading (which means a 10 per cent. diminution of lift), may be shown by the "lift to drift" curve spoken of in paragraph 9, to give a diminution of angle of incidence down to $8\frac{1}{2}^\circ$, and to diminish the drift of the main planes at this point as much as 20 per cent. or 30 per cent.

Turning to another matter:—

16. **Rate of Climbing.**—If the competition involves climbing at a maximum rate as one of its conditions, this chart is again of use. A speedometer giving speed through the air is imperatively necessary, and such an instrument has been designed at H.M. Aircraft Factory by Mr. F. Short, and used with conspicuous success on many flights. There is another instrument, *viz.*, Mr. Ogilvie's, and also an excellent one by the Cambridge Scientific Co., and doubtless others yet that may not have been produced commercially.

Reference to the chart shows that the maximum of horse-power for climbing purposes is to be obtained at the point of speed at which there is the greatest vertical distance between the "H.P. required" curve and the "H.P. available" curve. This may coincide, by a mere chance, with the speed of most economical flight, but it does not necessarily do so. The figured chart shows that the 5.3 h.p. was to spare for climbing purposes in the case of this particular aeroplane—and this was checked against the measured rate of climbing and the weight of the aeroplane. It tallied very well, as the rate of climbing was 140 f.p.s., and the weight loaded = 1,250 lbs.

17. It may be well to point out that if the regulations of any future competition were to call for, not the longest flight in duration of time on a limited amount of fuel, but for the *longest flight in point of distance*, a totally different speed is the best speed, *viz.*, the speed corresponding to the best gliding angle, in the example chosen a speed of 53 m.p.h. (instead of 47 m.p.h.).

18. It would be a mistake at this stage to enter into minor considerations such as the effect of the increased speed if the air due to the propeller slip passing over a portion of the planes when propeller is in front. It will be appreciated that such air movement over the planes is not accompanied by a corresponding forward movement over the ground. There is no particular difficulty in taking account of this, and in the present chart it accounts for the maximum speed at the intersection of curves 5 and 6 being in excess of the maximum flying speed by almost $1\frac{1}{2}$ miles per hour. The actual flying speed is marked on the chart.

"ERGAER."

WE extend our appreciation to the *Manchester Guardian* for its action in making known Dr. Hankin's researches in bird flight to its very wide circle of readers, by means of an editorial article, which we reproduce below. We reproduce this article, partly because we feel that every single reader of FLIGHT takes the keenest interest in knowing what other people have to say on a subject like this, and also because it strikes us as being only proper to put on record such criticisms as may be levelled against Dr. Hankin's research, even when, as appears to us to be somewhat the case in this instance, they are founded on a not too close study of the original work. We have a suspicion that the author of the article in the *Manchester Guardian* is better acquainted with the text of our own editorial on the subject of ergaer than with the articles by Dr. Hankin on which it was based.

When he says that Dr. Hankin concludes that soaring flight is due to a "form of energy drawn directly from the sun, and not to any movement of mass at all" he makes it appear as if Dr. Hankin were endeavouring to evade the possibility of wind soarability altogether. For all we know, Dr. Hankin may have something of extraordinary interest to say about the phenomenon of soaring in wind, but for the moment we are more concerned with his statements relating to the phenomenon of soaring under conditions that appear to throw doubt on the validity of applying the principle of wind soarability to all cases. The energy in wind is usually relied upon to explain *all* soaring phenomena, but every day at Agra soaring flight takes place and fails to take place under conditions that must make any serious student who is desirous of learning the truth hesitate to dismiss the problem under the accepted doctrine that wind energy must be present even if invisible.

Dr. Hankin does not deny the existence of upward currents because they are invisible, but he does bring forward evidence to show that even when you can see slight eddies in an apparently dead calm they do not coincide with the phenomenon of soaring. Also, he records instances where birds have seemed to avoid these zones rather than otherwise. It is in these minute and most carefully recorded observations that there lies the real value of Dr. Hankin's research, for therein alone has he made it possible to conduct a serious argument on the subject. Items of information that appear of the greatest importance to the observer may ultimately prove to be of less value than some other factor considered insignificant at the time, but faithfully recorded nevertheless.

For instance, is the observation of a falling feather evidence of the non-existence of an up-current of sufficient value to account for the energy required for soaring flight? Dr. Hankin has observed instances where light pieces of feathery down have become detached from a soaring bird's body and have steadily descended through the air. Major Cook also observed the same phenomenon while soaring flight was taking place, as he records in a letter that he has written to us on the subject. But suppose that experimental evidence were brought forward to show that the nature of the object were such as to require rather a strong up-current to make it float, then the evidence that it was falling on the occasions in question, would not have the significance that may at first sight attach thereto.

Nor by the way is it necessary, according to accepted theory, to have a very strong up-current to account for soaring flight mathematically. It is not the impact force of the direct upward velocity that has to be considered in estimating its lifting effect, but the value of the resultant that obtains from compounding the vertical vector with the natural gliding speed of the bird. In *Flight Manual* (F. 89), there is an analysis of Lanchester's method of treating the subject based on an observation of a pelican made by Peal at Brahma-putra. The mean horizontal velocity of soaring is given as 25 m.p.h., which is approximately equal to 36 f.p.s. It is assumed that the efficiency of the structure of the bird is at least such as to give it a gliding angle of not less than one in five. If unsupported by external energy, therefore, the bird may be assumed to be capable of descending to earth down a one in five slope at 36 f.p.s. This is equivalent to a drop of a little over 7 f.p.s., so that if the air in which the glide is taking place were to have an upward velocity of 7 ft. a second, then the glide downwards through the air would keep the bird always at the same altitude above the earth, that is to say, the bird would be soaring. But this same bird would, doubtless, make a poor parachute in the same zone, for the direct vertical lift of a 7 foot per second up-current impinging on its wing area, would certainly be insufficient to support the weight in stationary flight.

It is therefore not always the evidence that first appeals to the senses that is necessarily the most important, and it is because of many things that Dr. Hankin has observed that we are so anxious to see his suggestion that sunlight is a physical basis of soarability receive the very serious consideration of the whole world of science.

If ergaer is proved to be a reality, then Dr. Hankin has indeed discovered a subject of scientific interest that far outstrips the

boundaries of the already wide realm of flight. It is not our place to discuss those other aspects here, nor, if we may say so, is it quite the place of the critic of the *Manchester Guardian* to patronisingly dismiss Dr. Hankin's conception of ergaer as a "fairy tale." Dr. Hankin's articles in FLIGHT alone entitle him to be judged as a scientific observer of the very first order. Further than this we need hardly say in reply to criticism of this character, and to the pretty idea put forward in the same article, that birds easily soar in sunlight because they are in "good spirits," we might add the rider that we suppose they take the trouble to flap their wings at dusk because they are in a dull mood.

The following is the leader from the *Manchester Guardian* :—

"For the past two or three months a series of articles on the principles of bird-flight have been appearing in FLIGHT. Their author, Dr. E. H. Hankin, has proved himself a close and highly trained observer; his pages are full of the illumination that comes from peculiarly patient and minute observation; no future student of this fascinating subject will be able to do without his records and diagrams. But Dr. Hankin, besides being an observer, believes himself to be a discoverer, and that of a very remarkable sort; and 'ergaer' is the name of his discovery. He believes, in fact, that the well-known phenomenon of soaring flight, usually explained by the theory of upward or circular or pulsating currents, or at any rate by some movement of air in mass, is in reality due to a form of energy drawn directly from the sun and not to any movement of mass at all. He has collected and presented a large body of evidence to prove that what he calls 'soarability' is directly associated with the action of the sun's rays. Now, of course, it is no part of Dr. Hankin's business, at this stage of his investigations, to explain what 'ergaer' is and how it works, and consequently, even if you could pull to pieces his tentative explanation (and we believe a physicist would not find it difficult), you have not thereby necessarily disproved his discovery. Dr. Hankin thinks that 'ergaer' is 'a state of the atmosphere in which energy from the sun's rays becomes locked up in the molecular structure of the air, to be released by the passage of the bird's wing,' and that it makes itself felt in a way 'something in the nature of chemical disintegration resulting in a continuous series of minute explosions'—all of which is pure conjecture and pseudo-scientific fairy tale.

"We may let that be. What remains is the undeniable observation of soaring flights (a) when there was no perceptible air current; (b) when there were upward currents and eddies, but when in each case there was sunlight; and, on the contrary, of the absence of soaring when the eddies were present as before, but no sun. Do these facts in themselves justify the assumption of 'ergaer'? We think not, and we should be inclined to find Dr. Hankin's fallacy in the word 'soarability' and the theory it implies. The bird soars in eddies bathed in sunlight; it does not soar when the same eddies whirl under clouded skies (of course, some birds do, as any visitor to Blackpool on a cloudy day may see, but we put that aside); therefore the sun causes the soarability of the air! It does not take a logician to point out the fallacy here. Dr. Hankin walks in his garden when it is dry; he does not walk when it is wet, therefore dryness determines the 'walkability.' May it not be that the bird soars in sunlight and not in shade simply because it likes the sun? The technical editor of FLIGHT, without perceiving this point, still put his finger on it when he sought to support Dr. Hankin's theory by a comparison between open fire and steam heating in our sitting-rooms. Why is a room with a fireplace better to live in than one with a radiator? Not for any scientific reason, surely. Only because our 'spirits,' as we say, are more cheerful in one than in the other. May that not be the case with the birds, too? And may not one of the things that were too hard for Solomon have caught Dr. Hankin tripping?"

We have submitted the above article to Dr. Hankin. He sends us the following reply :—

The writer suggests that birds soar in the presence of sunshine because of its effect on their spirits. I think it would be a pity to dismiss this simple and straightforward theory as a fairy tale. It must be tested by means of facts. This theory, or any other theory, is useful if it explains facts, and if it leads to the discovery of new facts. It is contradicted by the fact that birds soar in the presence of cloud, as (to quote the writer) "any visitor to Blackpool on a cloudy day may see." It is unfortunate that this, the only fact brought forward in the article, is a fact that disproves the author's conclusion. Perhaps the writer will reply that Blackpool is such a pleasant locality that the birds remain in good spirits whatever the weather. In this case I must decline to continue the controversy. I have no intention of indulging in a war of words. My articles are addressed to serious students, and it is a matter of little importance if they make no impression on the casual reader.

The writer refers to the "well-known" phenomena of soaring

flight. I suggest that hitherto these phenomena have been "badly known." Suggestions that soaring flight might be due to pulsating or circular currents have only been made, so far as I am aware, by persons who have obtained their knowledge of soaring flight second-hand from untrained or casual observers. Of the forty-one chapters that I have published, there is scarcely one that does not contain facts incompatible with such assumptions. My Chapter XXXIX, entitled, "Ergaer, the physical basis of soarability," contains only an imperfect summary of such facts.

Let us consider the view that soaring flight may be due to an upward trend in the wind. Chapter XXXIX contains little or no reference to this possibility. But the student who has read my work carefully may recollect that in Chapters XV and XXIII, I described certain observations made at Ballia Ravine, where the wind had an upward trend of about 1 in 5, but where, in spite of this upward trend, soaring flight was replaced by flapping flight in the absence of sunshine. In Chapter XII, I quoted a fact that not only proves that sun soarability occurs in the absence of wind, but that it is actually favoured by the absence of wind. This fact is obviously incompatible with the idea of the importance of an upward trend.

Looked at from the broadest standpoint, there are only two possible views of soaring flight. Either it is due to ascending currents in the wider sense of the word, or it is due to something else. In a certain sense the hypothesis of ergaer is merely the hypothesis that it is due to something else. I may claim to have discovered the name, and to have discovered the notion. But I can scarcely claim to have discovered the thing. We only know things by their properties. As I have explicitly stated the research as to the properties of ergaer is a research that has only just begun.

But from another point of view the hypothesis of ergaer implies, and involves more than the simple negation that soaring flight is due to kinetic energy of ascending air. It implies, as the only possible alternative, that soaring flight is due to potential energy. This involves the assumption that there is some unknown thing or structure in which this energy is stored. A long line of research is thereby opened out. Already many facts connected with the flight of birds promise to receive a simple and easy explanation.

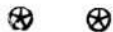
It may be of interest to readers of FLIGHT if I briefly indicate some of the directions in which we may hope for further knowledge of the properties of ergaer.

Firstly, if ergaer is an unstable chemical compound we may expect it to be less liable to decomposition at lower temperatures. I have evidence that birds show certain kinds of instability to a less extent at lower than at higher temperatures. These facts harmonise with the view (that I had arrived at on other grounds) that these cases of instability are connected with irregularity in the rate of decomposition or liability to decomposition of ergaer.

Secondly, facts in my possession show:—

1. That in the absence of sunshine and in the absence of wind soaring flight is impossible.
2. That in the absence of sunshine and in the presence of wind soaring flight is frequently possible.
3. It is convenient to refer to this phenomenon as "wind soarability." It occurs both in "storm soarability" and in "disturbed weather soarability" as briefly described in Chapter XV.
4. In certain cases of "wind soarability" I have observed that birds show a kind of instability that I believe is due to an increased liability of ergaer to decomposition.
5. These facts obviously suggest that the wind in "wind soarability" is caused or increased by a so to speak spontaneous decomposition of the ergaer.
6. I have ample proofs that the soarability in "wind soarability" is connected with ergaer, and that it is not due to any upward trend or ascending currents.

The above statements are not so much theories as titles of series



Flight from British Battleship.

A FINE performance was made by Lieut. Samson on Wednesday afternoon, when, rising on his Short aeroplane from a stage which had been erected on the fore part of H.M.S. Africa, in Sheerness Harbour, he flew along the Medway and finally landed at Eastchurch. On arriving at the flying ground his altitude was 800 ft. To facilitate the start of the aeroplane, the fore part of the battleship was cleared as for action.

The Aeroplane in Actual Warfare.

In a belated despatch to the *Central News*, Mr. H. C. Seppings Wright, who is with the Turkish Army in their fight against the Italians, includes a note regarding the aeroplanes with the Italian forces, which is illuminating from the lesson it teaches. In describing the retreat after the battle before Tripoli on December 4th, and the subsequent retreat to Azizia, he concludes:—

of facts that I have discovered, and that I hope to describe in detail on a later occasion. They suffice to show that the conception of ergaer is one that promises to lead to an explanation of a large number of phenomena.

Recently I was at Jharna Nullah, with a friend, watching the birds start in the early morning. I saw a black vulture starting. I said to my friend, "That black vulture shows lateral instability. Therefore the cheeks are gliding without tail jolting." Naturally, my friend was surprised that the presence of lateral instability in one species of bird should enable me confidently to assert the absence of transverse axis instability in a bird of another species. But such was the case. We both examined many cheeks, and found them all in steady flight. The amount of lateral instability shown by the black vulture was far too small for my friend to see, as he lacked special training in the observation of birds. But it was enough for me to assert that tail jolting movements were absent. I challenge people who indulge in vague speculations about upward trends or circular currents to give any approach to an explanation of this singular relation. This incident illustrates how upward trend or ascending current theories completely fail when brought face to face with the actual facts of the flight of birds.

I was recently watching a case of "wind soarability," in which, owing to a cause to be described on a later occasion, there was a progressive decrease in the soarability of the air. First flex-gliding up-wind became impossible. Instead, the cheeks had to use "lift-gliding." This was accompanied by gain of height. (The speed ahead, of course, was less than in flex-gliding. I have elsewhere shown that lift-gliding requires less energy than flex-gliding.) A few minutes later lift-gliding up-wind continued, but without gain of height. That is to say, there was a further decrease in the amount of available energy, and in some cases the birds had to flap for going up-wind. Here, again, is a series of phenomena, that as far as I can see, the ascending current theory hopelessly fails to explain.

A theory deserves consideration in proportion to the number of facts that it explains. The ascending current theory was made up by people who had no conception of the existence of such facts as I have described in this note. No facts of the nature on a logical proof have to the best of my knowledge ever been brought forward in its favour. To state that birds soar because there are ascending currents, and that there are ascending currents because birds soar is not a satisfactory way of arguing.

If the upward trend theory deserves more consideration than the ergaer theory, why not bring forward some experimental proof? For instance, I believe it is asserted that soaring flight might be explained if wind has an upward trend of a few feet in a second.

Supposing some light downy feathers were attached to a piece of thread and that the latter was attached to a kite string. Then on sending up the kite in a soarable wind the thread should show some indication of the upward trend. I have done so and failed to find any such evidence. It may be objected that perhaps the upward trend was present but that it was too slight to be detected by such a rough experiment. It appears to me that if the upward trend was too slight to be detected it was far too slight to produce such phenomena as the position of the wing tip feathers in fast flex-gliding illustrated in Fig. 74, page 1107.

On a later occasion I shall show that in certain winds birds fly steadily, that in other winds some birds fly with signs of transverse axis instability, and other birds show signs of dorso-ventral axis instability. I have reasons for hoping that explanations of these different kinds of instability will be given with the help of the conception of ergaer. It is scarcely to be expected that anyone will seriously attempt to explain the existence of these different kinds of wind by means of speculations about upward trends or currents.

London.

E. H. HANKIN



"An aeroplane which had been busy all day now gave us a show and floated over the chief lines of retreat, stimulating stragglers wonderfully. The scene from aloft must have been interesting—a line of hurrying, scurrying dots traversing the sand dunes, an abomination of desolation. Heavy rain and thunder clouds formed a background against which the smoke of bursting shells showed up white.

"These aeroplanes, even in their present stage of development, are quite enough to keep hostile camps on the move, and it seems to me that it will be almost impossible for future generals to establish permanent headquarters, unless in an underground bomb-proof camp.

"The evening closed in with unusual splendour. The aeroplane darted off like a dragon-fly towards Tripoli, leaving us to the darkness, the silence, and the safety of the desert. After gorging myself on a couple of sardines and bread, I sank amidst dumped-up baggage and camels and slept."

FROM THE BRITISH FLYING GROUNDS.

Brighton-Shoreham Aerodrome.

MR. M. CHANTER continued the tests of his new monoplane, and put one of the Blériots through its paces on Wednesday last week. At day-break the following morning, De Villiers was in the air with some good straight flights, and on Tuesday Mr. Chanter was testing a 40-h.p. Anzani-Blériot which has been undergoing a complete overhaul; while Gassler and De Villiers were putting in more useful practice.

On Monday we were hoping to see Mr. F. B. Fowler of Eastbourne, as it was arranged that he should alight here on his way from Beaulieu, but fate was against him, and he "landed" in the Solent. Next week we may be able to report his safe arrival here as we feel sure that his zeal is not damped, notwithstanding the ducking he experienced on Monday.

Brooklands Aerodrome.

On Wednesday last week the wind was gusty and treacherous, and Fleming, after making a trial on the Bristol, decided that it was too bad for pupils. However, he took up Lieut. Smith in the passenger's seat for a while. Later, Pizey, who has returned from Salisbury Plain, took this pupil up again, Merrian also being up as passenger with Fleming. At the Deperdussin school, Sabelli put in two circuits on the *brevet* machine, and later Gill flew his first circuit in irreproachable style, his landing being exceptionally good. Cadet Wheeler then took the air for 20 minutes on the Bristol, at well over 2,500 ft., finishing with a good *vol plané* and landing.

After this there was no flying owing to the bad weather until Monday last, when it was calm and frosty. Quite an eventful day ensued as three pilots obtained their brevets. Sippe on the Avro got through in excellent style, passing the second half in under 5 mins. Garne is another to the long list of the Bristol school's successes, and Graham Wood scores for the Hewlett Blondeau school.

Percival was out on his biplane, ostensibly for the purpose of testing the strength of his wing construction, as on one occasion he brought the machine down on one wing tip. Great was the surprise of spectators on finding that only the end rib was damaged. This machine should fly very well indeed when fitted with a propeller which will allow the engine to turn at its normal number of revolutions, and when the warp has been made somewhat more effective than at present.

Pizey was up with Lieut. Smith as passenger, getting him accus-

tomed to altitude and S-curve *vol planés*. Then he carried Merrian for landing practice, the latter afterwards making straight lines, and showing signs of improvement. At the Deperdussin school, Gill and Sabelli both flew good circuits on the *brevet* machine, the latter having an unpleasant experience. When at about 40 ft. the engine seized, causing the bolts through the propeller-boss to shear. In consequence the propeller flew off, striking the landing-chassis *en route*. Sabelli, however, landed without further damage. Gill then put in two circuits on the 35-h.p. machine, which, by the way, has now been fitted with a new Y-type, Anzani. Weighing only 55 kilogs., it gives 35-h.p. at 1,450 revs., and is a great improvement on the old type, while pilots are no longer subjected to "the little oil-bath" as before. It has also stood up to a 9-hours' test on the bench. Young and Setti practised on the Avro, the latter doing circuits. Kemp had the Vickers out for two circuits, then Fisher went for straight flights, as, after his long abstinence from flying, he is not quite at home in the machine. Pizey went up again, this time with Lane and Nesham, for instruction in handling control lever. Merrian then did four straights, and afterwards four circuits, coming down from 70 ft. *en vol plané*. Wind and rain then put an end to the proceedings.

On Tuesday, Gill flew some circuits on the 35-h.p. Deperdussin, and, continuing his progress, made excellent landings. Hunter was out on the Humphreys, which has been fitted with new *empennage*, and is flying better. Sippe was at work on the Viale-Avro, doing well, as usual, later Young doing rolling practice. A most regrettable accident occurred towards the end of the afternoon. Pullen, who has been working on the Humphreys monoplane for some time, had been attempting to start up the engine (which is fitted with dual ignition) on this machine. After giving the propeller a swing he stood back for an instant, and apparently thinking that the pilot had switched on, but that the engine would not fire, stepped back again just as the pilot switched on. The propeller struck him on the arm and leg, most unfortunately breaking both limbs. Some spectators were luckily able to render first aid, and thanks must be given to the owner of the car in which Pullen was taken to the hospital, as difficulty was experienced in obtaining the loan of the car which is usually hired for taking people to the station. This accident unhappily proves that dual-ignition by no means does away with the danger attendant to propeller swinging, and shows the necessity for both pilot and mechanic to methodically repeat the words "contact" and "off" (or their equivalents) when necessary. In this case no blame whatever is due to the pilot, who could not see Pullen step forward to give another swing-over.

Filey School (Blackburn Aeroplane Co.).

SEVERAL pupils were away spending Christmas holidays, and so on the last day of the old year advantage was taken by Mr. Blackburn to enjoy a few starts. He was out from 3 o'clock till dark, putting in some good short flights, handling the Isaacson Blackburn monoplane in grand style. Another Blackburn and two Blériot monoplanes have been undergoing thorough overhauling by mechanics during pupils' absence.

The New Year was begun by Mr. Blackburn and Brereton, the new pilot, late of the Bristol school, when some good manoeuvres were executed, some finishes in grand style being witnessed.

The rest of the week was spent in overhauling machines in hangars, as the pupils had not returned from their holidays.

School will be in full swing next week, when some good flying is expected.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Although the weather has been consistently bad during the past week, the school has put in a fair amount of practice, several of the more enthusiastic pupils being in evidence each day, with a view to improving their mechanical and constructional knowledge in the works, among those always on hand being Raphaite and Biard, who, whenever there was an interval from the rain and wind, were practising rolling on the School Farman No. 3.

Tuesday, however, showed a return to something like normal weather conditions and a pretty busy day was put in at the school. Clement Gresswell, the chief pilot, was out for a solo flight early in the afternoon on the school Farman No. 2, prior to taking up Biard in the passenger's seat for instruction, he being quickly followed by Fowler who put in some excellent straight flights with good landings, followed by Raphaite. During the afternoon, the new Sommer biplane, built by Messrs. Hyerman and Warren, fitted with 60-h.p. Aster engine, was in the hands of the engineers testing, the engine running well and the machine now looking in fine trim.

This day, also, saw the arrival, from France, of Mr. Robert Lorraine's new 70-h.p., two-seater, Nieuport, and Mr. T. O. M.



Sydney V. Sippe, who has just secured his certificate on an Avro biplane.

Sopwith with his Martin Handasyde, the latter having been brought by road from St. Albans in just over an hour; the neat way in which the machine was packed for transportation, and the facility with which it was handled, calling forth considerable praise from those present on its arrival.

Lewis Turner, an old-time pupil of the school, who has for several months been in Russia as chief pilot to the Kennedy Aviation Co., of St. Petersburg, has now returned, and has joined the school's staff of pilots, so that, given good weather, and taking into consideration the various types of machines now at "home" here, a very busy time is now anticipated.

Blériot School.—On New Year's Day Mr. Allen made three good flights round the aerodrome, and landed *en vol plané* in good style. Mr. Dessouter was making figures of eight, and should be ready to pass the tests for his *brevet* on the first fine day. Messrs. Morris and Welburn were doing good straight flights.

Tuesday, all pupils were putting in work, each making excellent progress. Mr. Pothet is very keen on all details of the work, and there is no doubt that he will soon catch up to his comrades who began before him. Mr. Gordon Jones is getting on somewhat slowly, but surely.

The remainder of the week the weather was too bad for any school work outside.

W. H. Ewen School.—The school has been busy in the hangar during the past week, making up spare wings and other parts, of which a good stock is kept. The weather, however, has been too bad for any attempt at out-door work. On Saturday, Mr. E. H. Lawford joined the school. This gentleman is connected with the Stock Exchange, and we believe is the first one associated with that profession to take up flying. On Sunday the Blériot was anchored and the engine started up, M. Beaumann, M. Dubois and Mr. Lawford all taking a turn each in the seat to get used to the draught of the propeller and control of the engine. On Tuesday afternoon the wind dropped sufficiently to take out the Blériot. Mr. Warren put in two straight flights to see if the machine and weather were right, M. Dubois and M. Beaumann afterwards taking turns rolling, and both shape very well for their first attempt.

Salisbury Plain.

Air Battalion.—The bad weather last week prevented flying, Captain Fulton, Lieut. Barrington Kennett, Lieut. Reynolds, Lieut. Conner, and Lieut. Hinds all spending their time overhauling the various biplanes and monoplanes quartered here. Monday

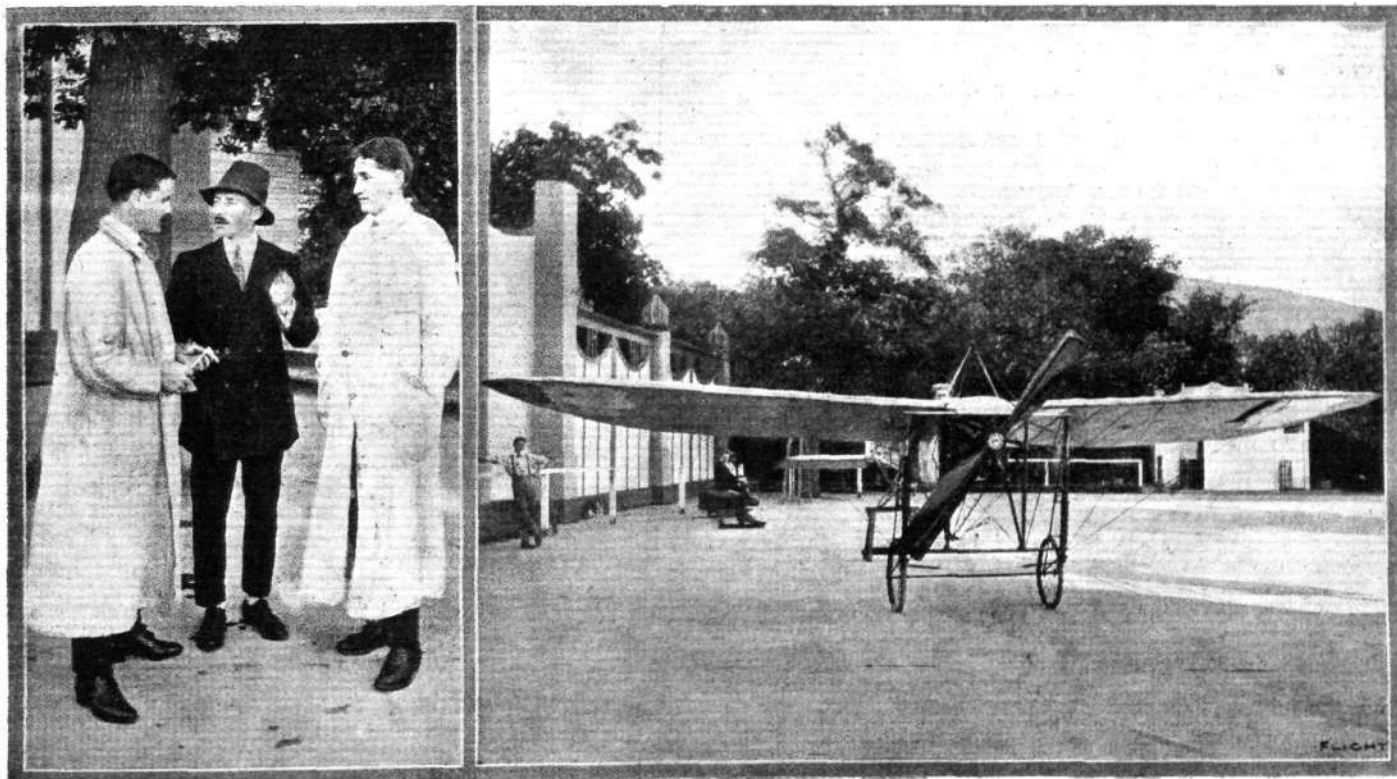
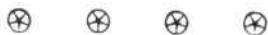
being a fine, frosty morning, Lieut. Barrington Kennett brought out the Nieuport monoplane and made a good flight lasting threequarters of an hour, during which some fine right and left-hand turns were seen. Later, when there was a stiff breeze blowing, Lieut. Reynolds had his Bristol biplane out, but found the conditions very difficult as the varying currents of air caused the machine to drop several times, once or twice as much as 100 feet. The engine was not working quite so well as could be wished, which added to the difficulty of the pilot, but he succeeded in bringing the machine down without any mishap. On Tuesday, Capt. Fulton brought out the Bristol biplane, later Lieuts. Reynolds, Barrington Kennett and Conner had their machines out, but the wind then got up too much and put an end to flying. It is expected that the Deperdussin for Capt. Fulton and the Bristol two-seater monoplane for Lieut. Reynolds will arrive shortly now.

Bristol School.—Tuesday morning last week was very gusty, and only permitted of one flight, in which Jullerot gave a lesson to Lieut. Brodigan.

On Sunday, in spite of a very gusty wind still running, Lieut. Borton, in a perfect flight passed for the first half of his certificate, observed by Lieut. Reynolds, R.E., and Lieut. Stuart. The afternoon was quite tempestuous, but Jullerot made one solo for the edification of Lord Torrington and party, who had arrived on a visit to the school. In the evening Lieut. Borton made another trip in the wind.

Lieut. Borton passed the remainder of the tests for his certificate on Monday, flying at 800 ft. and finishing with a beautiful *vol plané* with engine completely shut off and propeller stopped. This officer began his tuition at the end of November, so that, making the modest allowance of two weeks for weather during which flying has been impossible, it will be seen that he has qualified within the well-established Bristol average time of three weeks.

Lieut. Murray and Lieut. Ashton were taken for their last passenger flights by Jullerot, and Lieut. Bowers carried Lieut. Brodigan. These three pupils then commenced solo flying, and their performances are the more noteworthy on account of the strong drift caused by the north-westerly wind. Lieut. Ashton flew round Fargo at a height of 50 ft., making a good landing. Lieut. Brodigan made a similar flight at 200 ft., introducing a right-hand turn, while Lieut. Murray made a circuit with strong banking, performing a beautiful figure eight before landing. Lieut. Freeman took up machine No. 66 to 1,200 ft., and Bendall made a very neat circuit. He is now ready to take his certificate as soon as opportunity offers.



AVIATION IN SOUTH AFRICA.—On the left Mr. Compton-Paterson and Mr. Driver in the Good Hope Gardens with Captain Livingstone (in centre), who is associated with this aviation enterprise. On the right Mr. Driver ready for a start on his Blériot.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on the 9th inst., when there were present:—Mr. R. W. Wallace, K.C., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Prof. A. K. Huntingdon, Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. Mervyn O'Gorman, Mr. C. F. Pollock, Sir Charles D. Rose, Bart., M.P., Mr. A. M. Singer, and Harold E. Perrin, Secretary.

New Members.—The following new Members were elected:—Frank S. Barnwell, G. F. Campbell-Wood, Captain Robert Gordon, R.M., Captain R. M. Harbord, R.N., William Ewart Hart, E. B. Hedley, Dr. Ian Howden, J.P., Herbert Fetherston Lloyd, Captain George Hebden Raleigh, and Eng.-Lieut. C. R. J. Randall, R.N.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

- 169. Lieut. Garthshore Tindal Porter, R.A. (Bristol, Salisbury).
- 170. Lieut. Amyas Eden Borton (Bristol, Salisbury).
- 171. Benjamin Graham Wood (Hewlett and Blondeau Farman, Brooklands).
- 172. Sydney Vincent Sippe (Avro Biplane, Brooklands).

Special Certificate.—The following Special Certificate was granted:—

- 4. Geoffrey de Havilland (Factory Biplane, Farnborough). Course: Farnborough to Shrewton and back.

Balloon Competitions, 1911.—The Committee considered the log sheets of the performances accomplished in the Balloon Competitions during the year 1911, and the following awards were made:—

ROYAL AERO CLUB CHALLENGE CUP.

(Presented by Mr. John Dunville).

Hon. Mrs. Asheton Harbord—

December 29th, 1911, Pembroke Dock to Witham, approximately 240 miles. This being the third consecutive win for Mrs. Harbord in this competition, the cup now becomes her property.

The next longest distance recorded was by Mrs. John Dunville, approximately 174 miles. Battersea Park to Roye, in the north of France.

LONG DISTANCE BALLOON COMPETITION.

(Cup presented by Mr. A. Mortimer Singer).

Hon. Mrs. Asheton Harbord—

November 25th, 1911, Battersea Park to Burnham, Somerset, approximately 120 miles.

The next longest distances recorded were by Mr. A. P. Hohler, 112 miles, and Consul Gustav P. Stollwerck, 96 miles.

BALLOON ASCENTS.

(Cup presented by Mr. A. Mortimer Singer.)

Consul Gustav P. Stollwerck made the largest number of Balloon Ascents between September 1st and December 31st, 1911—namely, fourteen, thereby winning Mr. A. Mortimer Singer's Cup. Mr. C. F. Pollock made the next highest total—namely, twelve.

Flights Over the River Thames.

The following Resolution was unanimously passed:—

"That aeroplane flights over the River Thames or its banks during regattas, or on occasions when large numbers of persons assemble on the river or its banks, be prohibited, as being undesirable and fraught with danger to the public safety, and that



Lectures on Engines at King's College.

THE special course of lectures on internal combustion engines, with special reference to the petrol engine, was commenced on Thursday of last week at King's College by Mr. G. A. Burls, M.Inst.C.E. The lectures will be continued on Thursdays, and, in connection with the course, there will be a drawing and design class. Fee for the lecture course is one guinea, and for the drawing class two guineas.

A German Aviator for the Congo.

INSPIRED doubtless by the departure of Mr. Latham for the Congo, the German Colonial Office is seriously thinking of despatching an aviator to German West Africa to study the possibility of establishing an aeroplane station there and ascertaining the type of machine most suitable for use in the country.

any breach of this regulation be punished by suspension of certificate, and/or removal from the Competitors' Register, or otherwise, as the Committee thinks proper."

A letter has been received from the Home Office intimating that the Secretary of State does not, in view of the above resolution, think it necessary at present to make an order under the Aerial Navigation Act, 1911.

Alexander Prize Competition for Aerial Motors.

With reference to the prize of £1,000 offered by Mr. Patrick Y. Alexander, the tests have now been completed. The report of the advisory Committee for Aeronautics on the tests will shortly be made to a joint Committee of the Aeronautical Society, Royal Aero Club and Aerial League, who will make the award in conjunction with Mr. Patrick Y. Alexander. The representatives of the Royal Aero Club on the joint Committee have been appointed as follows:—G. B. Cockburn, Prof. A. K. Huntingdon, J. T. C. Moore-Brabazon, and Roger W. Wallace, K.C.

Royal Aero Club Challenge Cup, 1912.

Mr. John Dunville has kindly presented another One Hundred Guinea Challenge Cup for the longest voyage in any balloon, airship or aeroplane during the year 1912.

Gordon-Bennett Aviation Cup.

The cup having been won by a representative of the Aero Club of America, the race for 1912 will take place in the United States. The exact time and place will be announced later.

At the recent Conference of the Fédération Aéronautique Internationale in Rome, it was decided that the course is to be a closed circuit with a minimum of 5 kilometres, and the total distance to be flown is 200 kilometres.

Each club affiliated to the Fédération Aéronautique Internationale has the right to challenge the holder, the Aero Club of America, and such challenge must be sent in before March 1st, 1912.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before February 15th, 1912, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Balloon Race, 1912.

Entries for this race have been received from Mr. John Dunville and Mr. A. Mortimer Singer. The race will take place from Stuttgart in the autumn. The entries close on the 15th inst.

Army and Navy Aviation Prizes.

(Presented by Mr. A. Mortimer Singer.)

Army ... £500 Navy and Marines ... £500

This competition closes on March 31st, 1912. Rules and entry forms can be obtained from the Club.

The following are the distances so far recorded:—

Army.—Late Lieut. R. A. Cammell, R.E., 100 miles.

Navy and Marines.—Capt. E. L. Gerrard, R.M.L.I., 129 miles.

Annual Subscription.

Members are reminded that their subscription for the current year became due on January 1st, and are requested kindly to remit the amount of £2 2s. at their earliest convenience.

166, Piccadilly.

HAROLD E. PERRIN, Secretary.



German Army and Civilian Aviators.

THE German War Office has decided to make arrangements by which civilian aviators, who at present number 135, may be utilised by the army in case of necessity. Those who possess aeroplane certificates, on joining the army for their usual training in future, will be placed in the Aeroplane Corps.

Rapid Tuition on a Deperdussin.

LIEUT. GILL, who qualified for his *brevet* at Brooklands on Wednesday, had only had three weeks' tuition on his Deperdussin machine and during that time had no breakage whatever.

More Deperdussins for the French Army.

THE French Army has just ordered a further batch of Deperdussin monoplanes, nine single-seated machines and eleven double-seaters. They have also nominated a further 25 officers and non-commissioned officers to receive instruction at the Deperdussin school.

AIR EDDIES.



Lewis W. F. Turner, who has just returned to England after a four months' period of flying in Russia.

ment of their spring, in order to complete the practical tests.

Although he did not fly the machine he originally went out to test, Lewis Turner was by no means idle, for, before the really cold weather set in, he was given *carte blanche* in regard to the club Farmans at the St. Petersburg aerodrome. On these he showed the local talent how figures of eight are done in England. In his last flight, with the thermometer registering 12 degrees below zero, he passed over some of the suburbs of St. Petersburg, a risky thing to do in view of the stringent regulations against flying over that city.

Hugues Simon, a Parisian journalist, who will be remembered as having figured in a photograph published some time since in *FLIGHT*, of "Beaumont" and M. Chereau leaving Buckingham Palace after their audience with the King, has perfected a device to safeguard aeroplanes against fire.

The prospect of receiving Government orders is at least giving rise to developments in the industry. I hear that the well-known firm of Howard T. Wright is being acquired by the Coventry Ordnance Co., who are extensive contractors to the Government. The machine which they are entering for the Government tests is to be a biplane, equipped with a 100-h.p. Gnome, and I understand that it will be piloted by that able exponent, Mr. T. O. M. Sopwith. The present works at Battersea are to be retained until this machine is completed, when in all probability they will close down in the metropolitan area and continue their building operations in Coventry.

Sydney V. Sippe, who has just qualified for his aviator's certificate on an Avro biplane, at Brooklands, has had a longer connection with

THE other day, in town, I came across Lewis Turner, who has just returned from St. Petersburg, where he has been engaged on work in connection with the Kennedy Aviation Co. Contrary to his expectations, the machine was not finished before the advent of the Russian winter, and so tests have yet to be carried out. So severe is the winter in the north of Russia that flying has to be entirely abandoned, owing to difficulties experienced with the carburettor. In the meantime, the machine, a biplane of entirely novel design, is approaching completion, and Lewis Turner intends to return to the scene of operations at the commence-

the practice of aviation than is generally known. As early as the latter half of 1909, he, with his friend Jenson, constructed a monoplane on more or less "Demoiselle" lines, built throughout of steel tubing, welded together by the oxy-acetylene process. The machine was taken for testing purposes to Addington in Surrey.

On one occasion, when testing the pull of the engine, which was reputed to be of 20 h.p., but which never really gave more than 12, by running the machine, without wings, over the ground, Sippe had the misfortune to get into a rut, with the result that he smashed the propeller, both wheels, and incidentally his poor nose, which came into violent contact with a steel crossbar. With the engine tuned up and the wings fitted the machine flew at its first attempt, but as not much financial encouragement was forthcoming in those days, and indeed for the matter of that even at the present time, these experiments had to be brought to a conclusion, Sippe settling down to study, for the time being, the technical aspects of the science, while his friend Jenson went to India in connection with gas-engine work.

The writer, whose destiny it is to remain more or less all the winter working in cheerless London, is just envying Graham Gilmour, who has taken a machine out to sunny Antibes, on the French Riviera, where he intends to carry out flights during the season.

As foretold in these paragraphs a short while ago, Lieut. Spencer Grey and his Blackburn monoplane have not been long in proving their joint worth. Last Sunday he made a fine flight across Weymouth Bay to Portland Roadstead, where the Home Fleet are assembled at anchor. Circling overhead many times, he created a great impression, not only of his ability as pilot, but of the superficial grace of his machine.

Those of us who have personal recollections of Will Gibson in his capacity of works manager at the Blériot school at Hendon, will be interested to hear that, since joining Frank Champion, at the latter's school of aviation at Los Angeles, Southern California, he has successfully built and flown a biplane of his own design. The machine is more or less of the Avro type. Imagine a Blériot fuselage fitted with the Wright type wings, a Farman type chassis, Curtiss type control, with a 60-h.p. Hall-Scott motor mounted in front, and you have a mental perspective sketch of his biplane. That it flew at the first attempt is indicative of his ability as designer-constructor.

The new biplane, the first production of its type from the excellent works of the Aeronautical Syndicate, Hendon, the appearance of which was foretold some few weeks ago in *FLIGHT* has now been completed, and is now awaiting a spell of favourable weather for the initial tests to be carried out. Details I have already obtained, but these I am not at liberty to disclose until these tests have been brought to a satisfactory conclusion.

The excellence of the work of the Army aircraft factory at Farnborough is not so open to doubt as some would have us believe, for it was on one of the factory biplanes that Geoffrey de Havilland has just qualified for his superior certificate, completing the return course from Farnborough to Shrewton.

Things are moving apace at the Brighton-Shoreham Aerodrome. In order that shedholders may be on the spot and able to avail themselves of every period of early morning calm, a club house is shortly to be erected. A view of this building as it will appear when completed appears elsewhere in this issue.

It is intended to furnish 20 bedrooms for their use and two billiard-rooms, each with two tables, are to be provided. Good luck to such sound enterprise.

"OISEAU BLEU."

Edinburgh Aero Club.

It should be understood that this club is not a model club, although it is proposed to run a section for model makers and those working with gliders. The club will possess a biplane which has already been successfully flown. The subscription has been fixed at £2 2s., while that for the glider and model section will be 5s. A course of lectures is also being arranged.



By Tube to Hendon Flying Grounds.

WHEN the new extension of the Hampstead and Highgate Tube becomes a *fait accompli*, Hendon will be much easier of access to Londoners, as one of the five new stations—Collindale—will be quite near the flying ground. The work, however, will take two years to carry through after the necessary Parliamentary powers have been obtained.

FOREIGN AVIATION NEWS.

How They Do It in France.

ALTHOUGH the French Army estimates for this year include a sum of about £448,000 for military aviation, several members of the French parliament are strongly of opinion that this is vastly inadequate, and the Minister of War will have a number of questions to answer when the matter comes up for discussion. It is estimated that the French Army will possess *only* 234 aeroplanes by next spring, and it is suggested that the number should be well over 400.

Honour for "Beaumont."

THE village of Lodeve, the birthplace of Lieut. Conneau, who, under the name of "Andre Beaumont," won the Paris-Rome race, European Circuit, and the Circuit of Britain, has put up a permanent reminder of the fact in the shape of a tablet on the house in which the aviator was born. This was unveiled on Monday last by the Mayor, who also presented Lieut. Conneau with the Cross of the Legion of Honour.

Vidart in a Gale.

ALTHOUGH a tempestuous wind was blowing, Vidart, on Sunday last, on his Deperdussin monoplane, started from Amberieu to fly to Bourg on a visit to M. Messimy, Minister of War. The visitor was warmly welcomed by M. Messimy, and later he returned by way of the air safely to the aerodrome.

A Two Hours' Flight from Pau.

ON Sunday, Giraud on his Blériot-Gnome started from Pau and flew on to Mirande and Auch before flying back to Pau. The round trip occupied about two hours, during which about 200 kilometres were traversed. The aviator also made a similar flight on the 3rd inst. On Monday he flew over Tarbes, and covered 44 kiloms. in 20 minutes.

H. Farman and His Monoplane.

SEVERAL experimental tests were carried out by Henry Farman at Mourmelon on Saturday with his new monoplane, in one flight two passengers being carried.

Practising for the Michelin Target Prizes.

IN view of the forthcoming competition for the Michelin Target prizes several trials have been carried out at Buc with a Maurice Farman machine fitted with a special arrangement for dropping bombs.

Work at Maurice Farman School.

ON the 2nd inst. Lieut. Lucca flew over a circuit comprising Trappes, Coignieres, Etang and St. Quentin. Lieut. Coville took his Maurice Farman machine from Buc to St. Cyr, while Lieut. Battini was flying for a couple of hours round Buc. On the following day Lieut. Naé, accompanied by his mechanic, was up for two hours and a half, while Lieut. Bordage made a 40-minute flight.

A Fast Deperdussin for Vedrines.

IN view of Vedrines' proposal to shortly attack the speed records, a new machine has been specially built for him by the Deperdussin firm. It is fitted with a 100-h.p. Gnome engine, and during a preliminary trip on the 2nd inst. gave great promise of fine work, while the speed was not far off 150 kiloms. per hour.

An Exciting Moment.

WHILE making his last flight for his superior military certificate over a course from Pau to Avic and back, Naval Lieut. Lafon had a somewhat exciting experience. While crossing the hills at Cavezes-sur l'Adour the petrol feed pipe became choked. He started to plane down, but his Blériot machine bucked considerably at the air currents set up by the Adour Valley. Finally, however, much to the relief of the spectators, he made a safe landing on a piece of high ground alongside the river.

A Year's Work with the Viale.

THE Viale motor fitted to the Blériot monoplane belonging to Dancourt, has done splendid work during the past year, and enabled its owner to win several cups and prizes. It was on this machine that he carried off several events at the end of the year at Toulon.

Sommer to Move to Mourmelon.

IN order to cope with his increasing business, and so that all school work may be carried on under his personal supervision, Roger Sommer has, we learn, decided to transfer his works and schools from Douzy, Mouzon, &c., to Mourmelon, where a group of 14 hangars will accommodate as many as 50 machines.

A Lady Flies over Paris.

TO Mlle. Jeanne Tissot, it is claimed, belongs the honour of being the first lady to fly over Paris in an aeroplane. She was taken by Prevost on his Deperdussin on the 2nd inst., during their flight which lasted half an hour and started from and finished at Issy.

From Rheims to Buc.

ON the 4th inst., Verrier arrived at Buc having flown over from Rheims on his Maurice Farman biplane, he stopping *en route* at Meaux. During the last part of the journey he found the going very difficult owing to fog.

Honour for Belgian Ae.C. President.

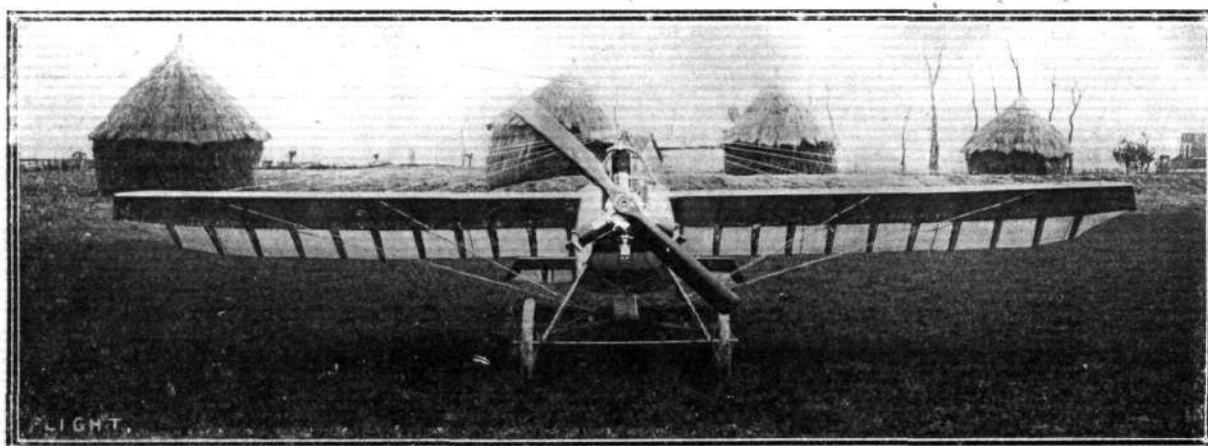
AMONG the hardest workers in the cause of aviation in Belgium is M. F. Jacobs the President of the Belgian Aero Club, and great satisfaction has been expressed at the honour conferred on him by the King of Belgium in making him an officer of the Order of the Crown.

A Belgian Military Aeroplane Competition.

NEGOTIATIONS are proceeding between the Belgian Aero Club and the Government with a view to the holding of a competition for military aeroplanes. It is suggested that the Government should provide the prizes and that the Aero Club of Belgium should organise and run the competition.

Another Royal German Aviator.

PRINCE SIGISMUND of Prussia, cousin of the Kaiser, was experimenting on Saturday last at Bornstedt with a monoplane which he has had built to his own design. It is said that good results were obtained and the tests were followed with great interest by Prince Henry of Prussia who, as our readers are aware, already holds his pilot's certificate.



The new Caudron monoplane which is characterised by its extreme simplicity of construction and the attention that has been paid to the reduction of head resistance. Equipped with one of the new 35-h.p. Y-type Anzani motors, it has attained a speed of over 65 miles per hour, a good performance for both motor and machine.

The German Navy and Aviation.

EVIDENTLY the German Naval Authorities are now going ahead in the matter of aviation as they are about to appoint a commission, with headquarters at Dantzig, which will study the question of forming a naval aviation corps. It is also proposed to attach to each division of the German fleet a vessel adapted as a mother ship for aeroplanes, while depots and stations for aeroplanes and dirigibles will be arranged for at each naval centre.

A Year's Work at Johannisthal.

DURING 1911 flying was possible at Johannisthal on 289 days and some 80 aviators combined to make an aggregate of about 7,000 flights. In the course of twelve months 48 new pilots made their qualifying tests at these grounds. During December, 53 aviators were in the air and 1,106 flights were made, a total duration of which was 126 hrs. 50 mins.

Aviation in Australia.

EVIDENTLY the Postmaster-General of New South Wales is of a progressive turn of mind, as on the occasion of the opening of a flying school at Penrith he made an ascent with Mr. Hart, who was the first Australian to earn his certificate in Australia. Mrs. Frazer was also taken aloft for a trip.

Flying in South Africa.

A FEW further particulars are now to hand regarding the flights made by Mr. Weston on a Bristol biplane from the Kenilworth Racecourse at Cape Town last month. A crowd of 1,500 people assembled and saw four separate flights, the longest, of $1\frac{3}{4}$ miles, being made at a speed of 60 miles an hour. On three occasions passengers were taken up, one being a lady.

Atwood has a Ducking.

A NOTE from New York states that on New Year's Day while experimenting with his hydro-aeroplane at Lynn, Harry Atwood fell into the sea. The machine was lost and it was only with considerable difficulty that the pilot was rescued.

Mr. Curtiss to Uphold His Rights.

THE Wright Brothers are not to have the American law courts all to themselves, and Mr. Glenn Curtiss has notified several builders who have copied his machines that he is the inventor of the shoulder control, and also of a device for equalising the pressure on ailerons, as well as other points in design, and that he is not acquiescent in the general use of his inventions, which are covered by patents.

The AeC.A. and Flying Over Spectators.

SEEING that some aviators were making a practice of flying low down over the crowds of spectators at baseball matches, &c., the Aero Club of America recently passed a resolution forbidding certificated aviators to make such flights, and any aviator ignoring this rule will be punished under Article 63 of the regulations of the Fédération Aéronautique Internationale.

Curtiss Machines for Paris.

ACCORDING to an advertisement in an American magazine, arrangements have been practically completed, by which Louis Paulhan will manufacture Curtiss land and water machines in France. One of the latest type Curtiss hydro-aeroplanes is to be delivered to Paulhan during this month.

The Aviation Industry in America.

UNDER a census taken by the American papers dealing with flying, it appears about 400 machines, of one sort and another, were constructed in the States last year, of which about 300 found their way into the air. No particulars are to hand from the Wright Brothers, but, apart from them, the chief constructors of the number of machines built were the Queen Monoplane Co., twelve monoplanes and three biplanes; the Moisant Co., twelve monoplanes and one biplane, while the Curtiss Co. turned out during the year about twenty-five biplanes, including three hydroplanes. The Benoist Aircraft Co. of St. Louis also built fifteen machines.

Long Flight by Harry Atwood.

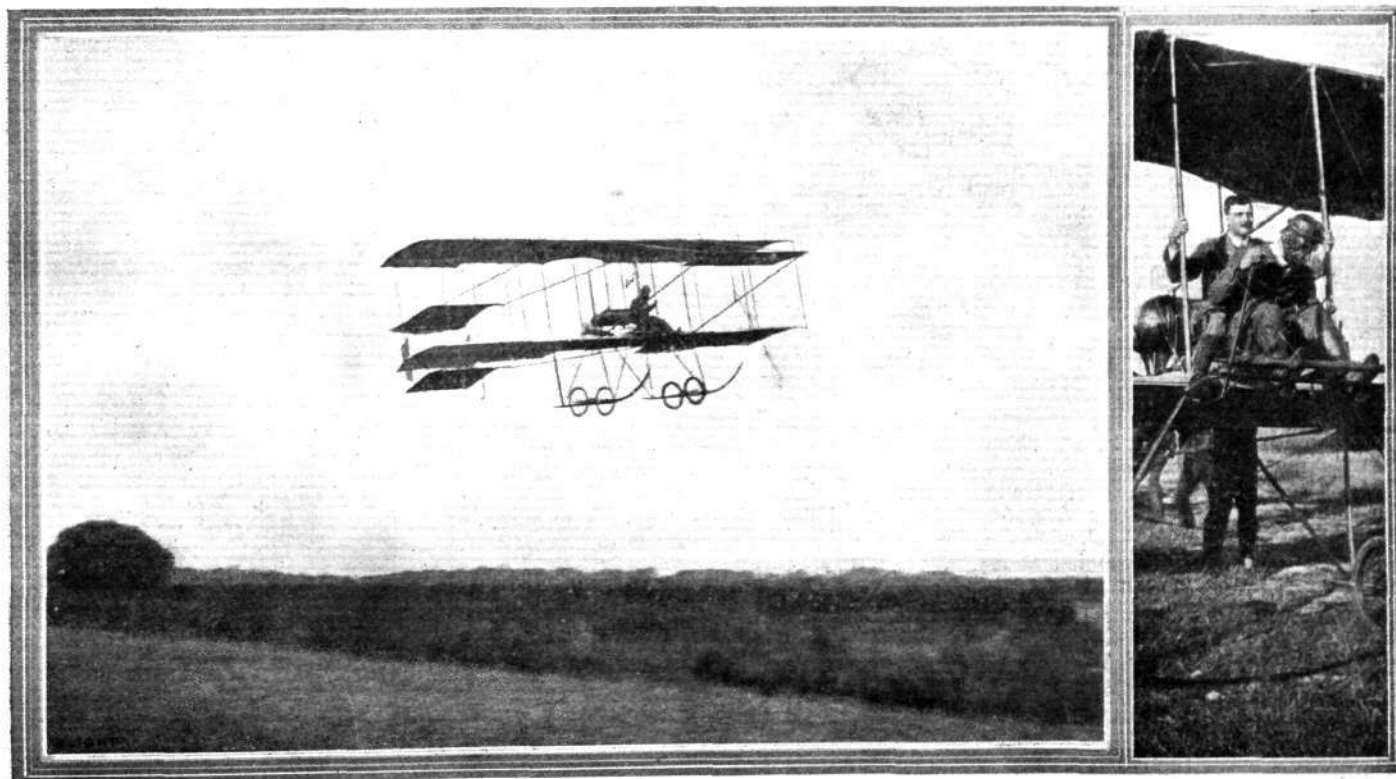
AT the helm of one of the Burgess-Curtiss hydro-aeroplanes, Harry Atwood, on December 20th, started from Lynn, Miss., and made an 80 min. flight, passing over Lynn, Marblehead, Swampscot, Saugus, and Nahant.

A New Wright Machine.

IT is reported from America that the Wright Brothers are now ready to deliver a new model biplane fitted with automatic stabilisers made according to the latest patents. These aeroplanes will also, if necessary, be fitted with silenced motors and an arrangement of floats enabling the machine to be used either over land or over water.

Flight from Mid-Atlantic.

As a variant to the proposals to fly across the Atlantic, comes the report that Hugh Robinson proposes to start from the deck of the liner "Amerika" while on its way from Hamburg to New York, and to fly on to the American shore. He proposes to use one of the Curtiss hydro-aeroplanes.



MESSRS. COMPTON-PATERSON AND DRIVER IN SOUTH AFRICA.—Mr. Paterson giving an exhibition flight at the Kenilworth Racecourse, and on the right he is seen with Mr. Fred Barling ready for his first passenger flight.

BRITISH PATENTS.

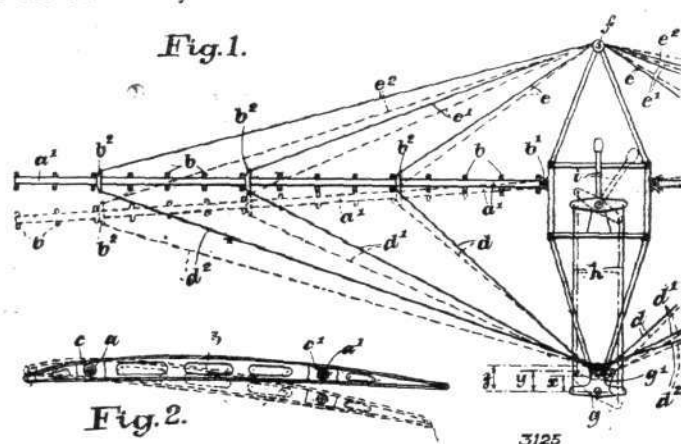
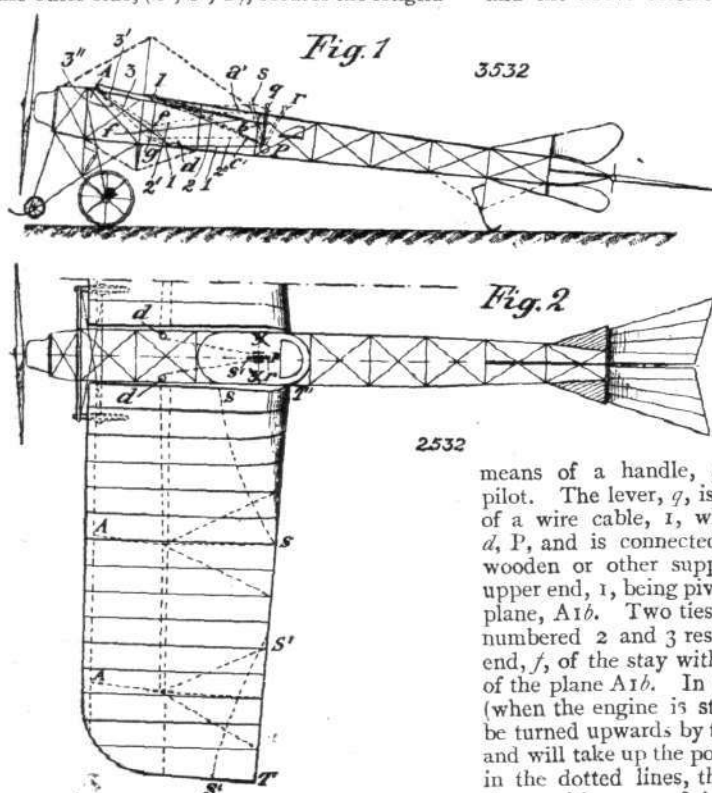
Specifications Selected and Abridged by James D. Roots, M.I.Mech.E., Thanet House, Temple Bar, London.

The first date given is the date of application; the second, at the end, the date of the advertisement of the acceptance of the complete specification.

3,532. February 11th, 1911. Improvements in or relating to Aerial Machines. Guido Antoni, and Ugo Antoni, both of 46, Via Vitt, Emanuele, Pisa.—This invention refers to improvements in the structure and control of lifting planes, such improvements being connected with equilibration and propulsion. In this invention a portion of one end of the plane in proximity to the rear edge is warped to a permanent curvature, the other end of such rear surface being flexible and adapted to be warped at will of the operator. Fig. 1 is an elevation, and Fig. 2 a part plan. When the aeroplane is at rest the planes are completely flat throughout their surfaces, with the exception of the rear portion, limited either by the dotted line, S, S, or by the dotted line, S¹, S¹, which portion is warped and turned upwards. The permanent warp of a portion of the rear surface of the plane either at the inner side, (S, S, T¹), or at the outer side, (S¹, S¹, T), secures the longitu-

motion of the lifting planes when so warped and curved downwards throughout their extent with the exception of the upwardly warped portions (S¹, S¹, T or S, S, T¹) above referred to. Owing to the flexibility of the planes, the degree of curvature may be varied so as to accommodate the same to the amount of the load to be lifted, whereby it is possible to increase the lifting power of the machine without changing the engine. Should the engine be stopped, the equilibrium of an aeroplane fitted with the flexible lifting surfaces would not be affected, as the flexible surfaces would assume by themselves an upwardly-directed curvature, as shown at a¹, owing to their flexibility and the pressure exerted thereon by the surrounding air. While either of the portions, S¹, S¹, T, or S, S, T¹, are permanently warped upwardly, the curvatures corresponding to the different conditions of equilibrium and lift above referred to are obtained by

to improvements in flying machine supporting planes which are to be warped or twisted for purposes of control, and to improved means applicable for use in warping or twisting such wings. Fig. 1 is a vertical transverse section, illustrating a front elevation of a rear spar, the view being taken at or about the line of the rear spar whereby the supporting surface or plane is warped. Fig. 2 is a side elevation of one of the rib members of the plane; the rear spar and the rib being shown in relation to the front spar in full lines and after warping in dotted lines. The front and back spars, a, a¹, of each plane are of circular section, and on these the ribs, b, are threaded, the latter being formed with circular holes, c, c¹, to receive the front and back spars respectively. "Wing-warp" is accompanied by a semi-rotary motion of the ribs about the front spars, a, the latter serving as journals, and



means of a handle, g, controlled by the pilot. The lever, g, is connected by means of a wire cable, i, which runs on pulleys, d, P, and is connected to the end, f, of a wooden or other support or stay, f, i, the upper end, i, being pivotally connected to the plane, A1b. Two ties, preferably steel, and numbered 2 and 3 respectively, connect the end, f, of the stay with the points, A and B, of the plane A1b. In the position of descent (when the engine is stopped) the plane will be turned upwards by the upward air pressure and will take up the position, A1 a¹, indicated in the dotted lines, the lever, g, taking up the position, s, of its own accord. The stay moves to the position, e i, and the ties to 2¹ and 3¹ respectively. When the aeroplane is starting or running in a normal course the plane, A1b, should be deflected and curved downwards to take up the position A1 c¹. To effect this the lever, g, must be moved to the position r, when the stay will move to the position I g, and the ties to 2¹¹ and 3¹¹ respectively.—December 20th, 1911.

3,125. February 7th, 1911. Improvements in Supporting Planes for Flying Machines. G. H. Challenger and the British and Colonial Aeroplane Co. Ltd., Clare Street House, Bristol.—This invention relates

the circular holes, c, in the ribs as bearings. The back spar, a¹, of each plane is moved up and down, about its articulated joint, b¹, by means of several control-wires, d, d¹, d², attached to the underside of collars, b², provided at various points along its length, a similar number of supporting-wires, c, c¹, c², being attached to the top of said collars and led over a pulley, f, provided on the frame of the machine to corresponding collars provided on the back spar of the other plane. Each upward or downward movement of the rear spar of one of the planes necessitates an equal and opposite movement of the rear spar of the corresponding plane. The opposite ends of the control-wires, d, d¹, d², are attached to a central arm, g¹, of a three-armed lever, g, at certain predetermined distances, as x, y, z, from the centre of rotation, the distances being so proportioned that, from any given degree of rotation of the lever, each wire is actuated to such an extent that each point of the spar to which the wires are attached is moved sufficiently to keep the spar straight throughout its length. The remaining arms of the three-armed lever, g, are connected by means of wires, h, to the corresponding arms of the warping-lever, i, the movement of the latter being transmitted to the three-armed lever.—December 20th, 1911.

dinal stability of the machine and prevents its being overturned. As is well known, the adoption of curved planes enables a greater reduction to be made in the necessary lifting area than if a flat surface is employed. In order to take the above property into account the lifting planes are provided not only with the portions, S¹, S¹, T, or S, S, T¹, which are warped under any working conditions, but are also capable of being deflected and curved downwards on their rear side, for instance, from A1 b, Fig. 1, to A1 c¹, when the aeroplane is either starting or running at its normal speed. In Fig. 1, the contour, A1 c¹, represents the section in the direction of

Japanese on Board "Capitaine Ferber."

THE Japanese mission visiting Europe paid a visit to the Zodiac headquarters at St. Cyr on Monday, and after witnessing several demonstration flights by aeroplanes, four of the officers, Col. Yamada, Col. Azakuno, Col. Kitayama and Commander Sasamoto, went on board the dirigible "Capitaine Ferber" and, piloted by Count de la Vaulx, were taken for a cruise over Satory and Versailles.

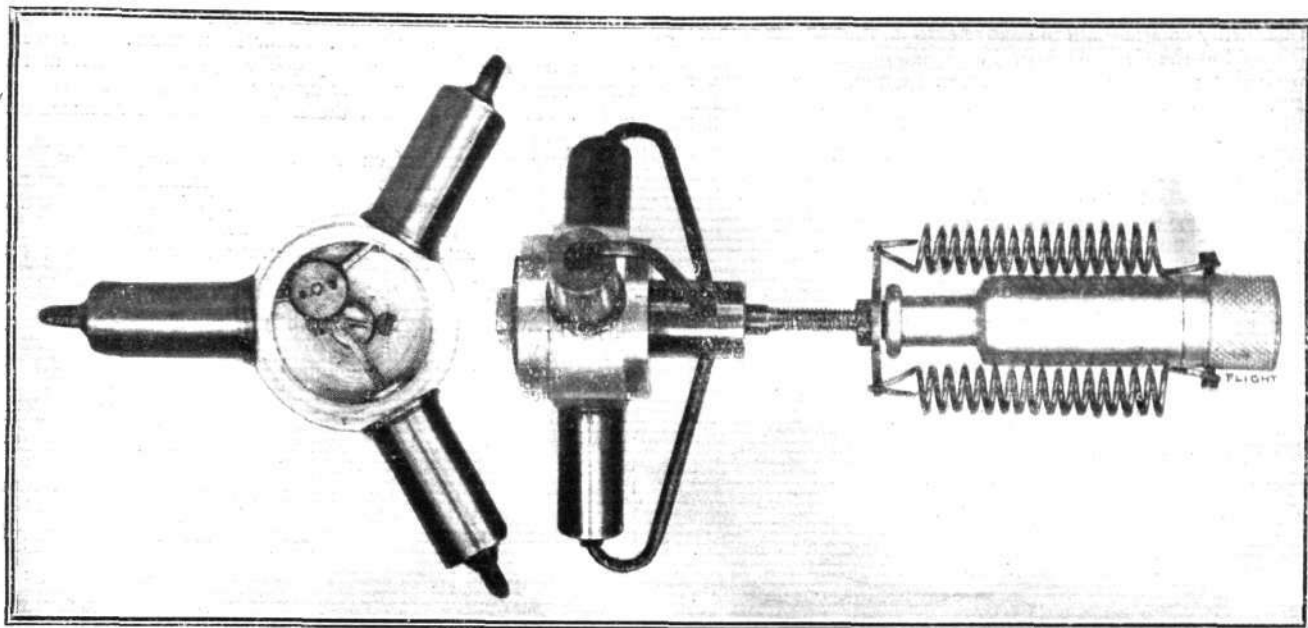
Missing Austrian Balloon.

ON December 27th Lieut. Werner left Salzburg in a military balloon belonging to the Archduke Joseph Ferdinand and nothing more was heard of it until Monday, when it was sighted in the snow on the top of the Pyrh Pass, 7,000 ft. high, near Spital Caninthia. A relief expedition started at once, but it was feared that Lieut. Werner could hardly still be alive.

FIEUX CO₂ MOTORS FOR AVIATION MODELS.

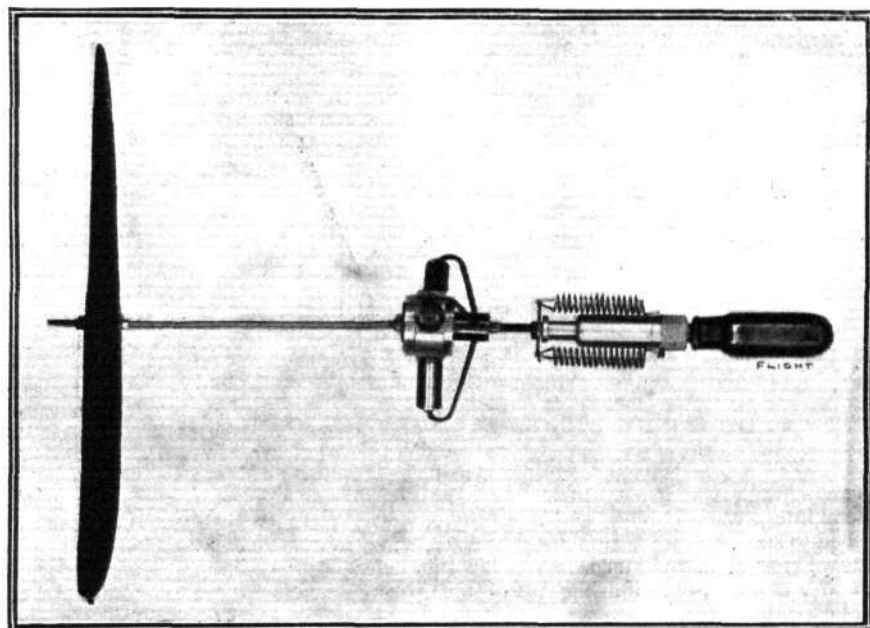
THIS ingenious and well-made engine is a move in the right direction to popularise model aeroplaning, if in ordinary practice the little motor proves as reliable as it gives promise of being. The construction is in miniature, and very similar to that of the famous Gnome petrol engines, the arrangement of the connecting rods being identical. Of course, this model

shaft, and D is the exhaust, which is connected to ports at the gas-cylinder end of the valve-casing. Messrs. G. N. Edward and Co., of 18, Berners Street, Oxford Street, W., who are the English agents for this engine in Great Britain, also supply a 2-cylinder and a 5-cylinder engine, the principle of which is precisely similar. The latter model is claimed to give off about 1.10-h.p. at 1,350 r.p.h.

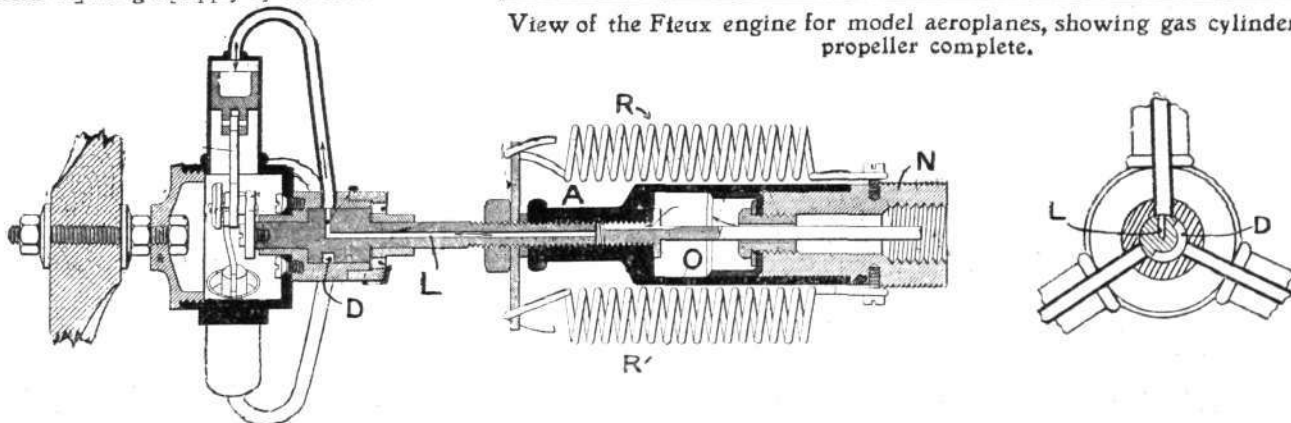


Enlarged view of the Fieux CO₂ rotary engine, showing the interior of the crank-case.

works on the two-stroke principle, which ensures there being a very even torque, even with the 2-cylinder model. The illustrations make the construction clear, so it will suffice to say that the crank-case and chamber, A, are of aluminium, and the cylinders of bronze. About the only part of the machine that requires a detailed description is the device for regulating the pressure between the container and the engine cylinders. Carbon dioxide gas is contained at a pressure of about 7 atmospheres in the little sparklet cylinder shown at the bottom of the full-length picture. When this cylinder is screwed home into the end of chamber, A, the gas is liberated by the end of the container being thrust in by the pin situated in the middle of the threaded portion. When this gas reaches, O, under pressure, it tends to drive the part, N, outwards against the pressure of the springs, R, on either side. It will be clear that when this action takes place the central pin will no longer hold open the orifice of the cylinder, so that the supply of gas will be cut off until sufficient has been used from, A, to allow the springs to bring back N, to its normal position. Thus the pressure is kept constant, and can be regulated by the tension of the springs. In the section of the distribution valve-gear, L, is the inlet pipe, which is connected to the gas supply by the hollow crank-



View of the Fieux engine for model aeroplanes, showing gas cylinder and propeller complete.



Sectional drawing of the Fieux engine, with diagram of the distributor valves on the right.



Conducted by V. E. JOHNSON, M.A.

The Blackheath Aero Club Exhibition.

WE must heartily congratulate the above club on the success of their exhibition held at the Central Hall, Peckham, on January 4th, at which we had the pleasure of being present. On entering the room one found oneself surrounded by models—not of that type which look as if the longest flight they have ever made was an accidental fall from the top of a glass case to the bottom—but by well-designed business-like models which had obviously done successful battle with the elements and meant to do still more.

Amongst the types of models represented were long-distance fliers; biplanes, monoplanes, self-rising models—tractor-screw models—both with one tractor and two—and last, but not least, some (comparatively speaking) small power-driven machines. The engine of one of these latter was shown running, and in spite of the fact that its “feeding bottle” had got broken *en route*, and it was running on strange food; the way in which the tiny motor drove the large propeller round gave promise of great things and was justly loudly applauded.

Add to all the above a room full of enthusiastic workers—with some of whom we had great argument—and combine this with the fact that last week's issue of FLIGHT alone contained accounts of doings sent in by no less than *twenty-one* such clubs, then surely there is little or no justification for any such pessimistic view of model aeroplaning as a contemporary is good enough to express. Perhaps the greatest compliment that we can pay the above club is contained in the simple sentence—that we all but lost our last train home.

Deducing the Velocity of the Wind by Observation of Ordinary Objects.

The following rough-and-ready methods may prove useful to aeromodelists. With a velocity of less than 1 mile per hour, no movement is perceptible, and smoke ascends vertically. With a velocity of 1 to 2 miles an hour the wind is perceptible, and moves a pennant. From 8 to 14 miles an hour it is moderate, stretching a flag and moving the leaves of trees. From 16 to 24 miles an hour it may be termed fresh and moves the branches of trees; from 24 to 37 miles an hour it is strong, and moves the larger branches and smaller stems. With a velocity of 37 to 60 miles an hour it is a gale, and entire trees are moved.

Power-Driven Models.

A correspondent, writing *re* the above, states that he has gone on several occasions to various places to see such models in actual flight, but that the latter event has never “come off.” He then proceeds to state his unbelief in such flights, and concludes by asking point blank if we have ever personally seen such.

Now we should not refer to the matter at all, except that we have reason to believe that this view is shared by some others.

There is an old saying that seeing is believing, and no doubt there are those who insist, or who can insist if they so choose, on a literal interpretation of the same. In reply, we regret to be compelled to state that we have not seen such a model in actual flight, but we most certainly intend to remedy this defect at the earliest possible moment, even if at the cost of some personal inconvenience and expense.

We are forestalled by our correspondent as to photographs, because he declares that such can easily be “faked”; evidently, nothing but the real thing will satisfy him. We have often heard of this curious mental attitude, but have never before come into actual personal touch with it.

Referring to Mr. Dollittle's Gnat Model a correspondent asks:—(1) How are the stays arranged to support the main plane? (2) How many turns are given to the rubber motor? (3) Of what does the

bearing of the tractor-screw consist? (4) How are the main planes ribbed? perhaps, the designer will kindly supply this information.

Victor M. writes: *re* 24-oz. Victor Monoplane. The weight of the rubber is exactly 1 oz., propeller pitch 23 ins., and about 1,150 turns (when making its 2,265 ft. flight), were given to each motor. The wind velocity, therefore, more than balanced the slip of the propellers.

In reply to a query of ours, Mr. Dollittle states that he has found it decidedly more efficacious to place the vertical fin above the back rider plane than beneath, a result which is in agreement with the theory that a fin should be above (and behind) the centre of gravity.

A correspondent, writing from France, states that his tractor-screw model—centrale type propeller, pitch 20 in., diameter 12 in.—has flown 200 yards. This is a decidedly good flight for a model of this type, which does not receive (in England, at any rate), the attention which it deserves.

Will any readers who have experimented with twin-screw tractor models please communicate results.

Re our remarks in December 30th issue as to a self-rising tractor-screw model, flying a quarter of a mile; we, of course, meant a twin-propeller model; and in our comparison between the two types, we never intended (as some readers appear to have thought) to contrast any twin screw rubber-driven model with a single-screw type of the same, as any such comparison would be manifestly absurd.

D. McRay and H. Foyer (14, Upper Northgate Street, Chester), who have sent us some very interesting particulars of one-third full-size scale glider that they have constructed, would be glad to hear from anyone interested in aviation with a view to forming a club in Chester.

E. J. Harris (147, Hammersmith Road, Fulham) would be glad to hear from anyone interested in models, with a view to forming a club in Hammersmith and Fulham.

Replies in Brief.

B. F. H.—In the early days of models, when it was a great novelty everywhere, a certain number of professional model exhibition flights were given about the country, chiefly, we believe, at country fêtes. We should, however, very much question if there is anything further to be done in the matter, unless you have something very extraordinary to show. We can give you no information as to any scale of charges. That, we should think, would be a matter of mutual arrangement. In any case, we should think it most unwise to risk it as a speculation.

C. R. BENNETT.—You must use two propellers instead of one, so as to be able to increase the pitch (this quite apart from other advantages). Try a pitch double the diameter, or even two-and-a-half times. Your propellers must run at least 36 in. According to Mr. Dollittle's experiment with twin-screw tractors, some very curious and at present inexplicable difficulties are met with, which much need further investigation, relative to which we hope soon to make some experiments. It is not, of course, essential the model should rise in its own length, but when facing the wind, I see no reason why it should not. By all means send a photo as soon as you have a good one. Your query, *re* soldering aluminium, is answered in the last issue. We never use aluminium, we have always found we could arrive at the same result better by other means.

H. VOSS HALL.—The paper gliders you sent to be tested are excellent. No. 1 has given the best results, being the steadiest, as well as the most stable in flight, and showing no signs of interference. We found it possible to make this glider do practically anything we pleased. It does not follow a tractor model on the same lines would answer, owing to propeller draught.

An Offer of Aviation Books.

A READER of FLIGHT writes as follows:—“I have a number of copies of FLIGHT, including nearly all the *first* issued complete; also certain books on aviation, such as Maxim's ‘Artificial and Natural Flight,’ &c. I should be pleased to give them to one of the societies if application is made through the Editor of FLIGHT.” Any letters addressed to “D. C.,” care of the Editor, 44, St. Martin's Lane, W.C., will be forwarded.

Model Clubs for Sheerness, Leicester, Blackburn, and Salisbury.

WE have received several notices regarding clubs which are in process of formation, and any of our readers interested in models in the following districts are asked to get into communication with the gentlemen whose names are given below:—Mr. E. M. Lear, 41, St. Mark's Road, Salisbury; Mr. H. J. Fuller, Norlands, Marine Parade, Sheerness; Mr. A. A. Wright, Albion Street, Anstey, Leicester; Mr. Thomas Livesey, 83, Cambridge Street, Blackburn.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

MODEL CLUBS.

Aberdeen Aero Club (387, HOLBURN STREET, ABERDEEN).

A MEETING of the above club was held on Saturday, January 6th, in the Trades Hall, Aberdeen, for the purpose of electing new office bearers as follows:—President, Mr. J. Wilson; Vice-President, Mr. G. R. McRobert; Committee, Mr. L. Gray, Mr. W. Anderson and Mr. E. Crombie; Secretary (*pro tem.*), Ed. Crombie.

Aero-Models Assoc. (N. Branch) (15, HIGHGATE AVENUE, N.).

A MEMBERS' social is to be held at above address to-day (Saturday), at 7 p.m. All interested are cordially invited, and the secretary would be pleased to see anything in the way of models or parts brought along.

A model flying meeting has been arranged for Saturday next, 20th inst., at the club's flying ground in Bishop's Avenue, East Finchley, N. (Vivers Lodge Dairy Farm), at 3 p.m. sharp. Competition for distance; no entrance fee for members or non-members. Messrs. R. G. Corder and Co. have very kindly offered a prize, consisting of model aeroplane goods to the value of 5s. (to be selected by winner). Intending competitors please notify secretary, as above.

Birmingham Model Ae.C. (8, FREDERICK ROAD, EDGBASTON).

At the general meeting, held on January 3rd, after the reading of the statement of accounts and the yearly report, the following new members were elected: Messrs. Baxter, Burt, and Messrs. Overton and King, of Coventry. It was unanimously decided to fix the headquarters of the club at the Bell Hotel, Philip Street, off the Bull Ring. Messrs. Weston, Hurlin Co.'s offer of a model for competition was then announced, and it was decided to put this up for the junior section at an early date. The rules were passed, and the following officers elected: joint hon. secretaries, Messrs. R. Cobham and G. Haddon Wood; joint hon. treasurers, Messrs. R. Platts and E. Trykle; chairman, Mr. F. Hill; vice-chairman, Mr. B. W. Beeby, and twelve members for the committee.

A resolution was passed that Lord Norton, who is already one of the club's vice-presidents, should be asked to accept the presidency of the club.

The whole of the club's flying ground was one white sheet last Saturday, and, as a consequence, there was a small turnout of members. However, Mr. M. Vale braved the snow, and obtained some very good flights with his model, "The Raven." The next day, however, there was a very much better attendance. In the early part of the afternoon, Master Stamps was obtaining his usual splendid high flights, finishing with a glide, with a new model, but later the model got tired, and refused to make any decent flights. Mr. G. Haddon Wood's model did not seem to be up to the mark, although at first one or two good flights were made. Mr. Robertson was getting fair flights, but as his model has not been touched for several weeks it required some amount of tuning up. The partly doubled-surfaced plane on Mr. G. Baker's model seemed to be fairly efficient, some extremely good flights being made, the average being between 900 and 1,000 ft. He, however, was rather unfortunate in getting his model stuck up a tree. Some new models were being tested by Mr. E. Trykle, some very fine high flights being obtained. The wind during the afternoon was anything but suitable for flying, it being very gusty, therefore, considering that he got a flight of approximately 1,800 ft., the model flying out of the ground, crossing a brook, and then over a group of trees, it was not at all bad. It may be as well to remind those interested in Birmingham that this club is the only provincial aero club which possesses its own private flying ground, large enough for full-sized aeroplanes, as well as a workshop on the ground. The club is anxious to make itself one of the strongest in the country, and as this can only be accomplished with a large membership, applications are earnestly requested.

Blackheath Aero Club (196, BROCKLEY ROAD, BROCKLEY, S.E.).

On January 4th the Club held their first Model Aeroplane Exhibition, and there was an excellent attendance of enthusiastic model makers and model flyers, and amongst those present, well known in the "model-aviation" world, was Mr. A. C. Horth, who appeared greatly interested.

Steam-driven models were shown by Messrs. H. H. Groves and A. W. Myles. The latter exhibited his model "Antoinette," which was fitted with a 3-cyl. rotary engine driving a 10-in. tractor-screw. The new tail-first monoplane shown by Mr. Groves was undoubtedly the centre of attraction, and the interest increased when the owner gave a practical demonstration of the engine's capabilities. This engine gives approximately $\frac{1}{2}$ -h.p. at 1,600 revs. per min., and has two horizontally opposed single-acting cylinders, and drive a 16-in.

propeller giving a thrust of 1 lb. for one minute, gradually falling off to 8 oz. thrust at the end of two minutes.

The construction of this machine was typical of Mr. Groves, and was admired by all on account of the excellent design and clever arrangement of the power-plant. Both the above models have proved their ability to accomplish successful free flights and many B.Ae.C. members are anxiously awaiting the time when they shall have the privilege of witnessing further flights.

Mr. J. H. Dollittle exhibited his new "twin-tractor" monoplane and also a three-cylinder rotary engine, and Mr. H. J. V. Stevens showed a two-cylinder (vertical) steam engine of sound design. Biplanes were shown by Messrs. L. Brough and A. B. Clark, and the "scale" model Blériots made by Mr. A. E. Collins and the Secretary were on view.

Rubber-driven monoplanes were shown by the following members:—Messrs. Whitworth, Woollard, Plummer, Brough, Pizey, Egelstaff, Trask, Holland and Thompson. Mr. Clark's $\frac{2}{3}$ -oz. "Victor" monoplane was very closely examined on account of its recent splendid flight of 2,265 ft.

The meeting was an unqualified success, and the Committee hope to arrange a similar exhibition in the Catford district shortly.

The following new members have been elected:—Mr. H. H. Groves of Westcombe Park, and Messrs. F. Thorpe, F. Loft and G. Pellett.

During the past week many flights were made by Mr. L. B. Morris at Lee, and by H. H. Pizey at Grove Park. There was also a fair muster of friends and members at the Lee aerodrome on the 6th inst., and good flights were made by Messrs. Packham, Pizey, and Trask, and Mr. Clark's $\frac{2}{3}$ -oz. monoplane experienced no difficulty in flying over the $\frac{1}{2}$ -mile without the aid of a strong breeze. Messrs. Dollittle and Whitworth were again experimenting with their tractor models, and the Committee are very pleased to note the excellent progress made with this type of model aeroplane.

To-day (Saturday) there will be held at Kidbrooke three open events for "distance," "duration," and "steering," and Mr. J. H. Dollittle will present a cup to the constructor of the model which gains the highest total number of marks in these contests. For full details see last week's FLIGHT. Further interesting competitions are being arranged, full particulars of which will be published at an early date, and several silver cups have already been received from friends interested in the future of the club, and these cups will be offered as prizes in the forthcoming contests.

Bootle and District Aero Club (late Liverpool Model Aero Club) (39, BROOK ROAD, BOOTLE).

ON January 1st, some fine flying was seen on the Club ground, notably by Messrs. Ledward, S. Malins, Huntington, and Harley. The only faulty part was the tendency to circle, and many flights which would have made Club records for distance, could not be counted. Ledward put up 24 seconds duration, coming very near indeed to the record. A large kite was flown by a prospective member for some time, but there was not enough wind to keep him busy. Subscriptions for this year due on February 1st.

Brighton and District Model Ae.C. (36, LITTLE PRESTON ST.).

OWING to bad weather the club was, for the first time in nine weeks, unable to fly at Shoreham on Saturday last. In the evening, however, a New Year's meeting was held, Mr. Burghope, vice-president, taking the chair, or rather bench. Mr. Pettett, secretary of Brighton-Shoreham Aerodrome, was amongst members present, and was able to give the club some sound advice on "how to succeed." Mr. Von Wichmann, hon. secretary, told the meeting that finances were healthy, and announced that Mr. Mellersh, late Bristol pupil, had joined, so that the club now boasts its certified pilot, a fact of which members are not a little proud. Rules for to-day's (Saturday) competition were fully discussed. Mr. Townsend, father of one of the members (erroneously called "Armstrong" in last week's notice), promised two prizes of £1 and 10s. respectively. Committee meets on Wednesday to consider competition for them. Mr. Barnett promised gold medal for the flight which created most public interest (he called it "prettiest" flight), and the chairman offered a prize of complete model for first successful hydro model. Mr. Bate offered a pair of curved propellers for quarter-mile flights. The meeting expressed its sincerest thanks to Mr. Townsend for his sporting offer. The "interested French gentleman" of last Saturday's notice turned up at the meeting and joined. He is, however, Mr. Paul Rother, a naturalised Englishman. He showed some of the members the most beautiful scale Blériot (inch to foot) one could imagine. One feels almost sorry he intends to fly it. It only weighs 4 ozs. (without rubber). Mr. Rother is without doubt

the most skilled workman in the club, and probably in any other club.

Competition at Shoreham to-day (Saturday) in form of point-to-point races. Open to all. Prospective members apply hon. sec., A. Von Wichmann, "Kingsleigh," Kingsway, Hove. Club welcomes as a member anybody interested in flying.

Dover and District Model Ae.C. (21, GODWYNE ROAD, DOVER).

Mr. F. W. DUCKHAM, A.M.I.C.E., has very kindly consented to act as president of the above club. A flying meeting was held on Wednesday last week, but, owing to the strong wind, the distances were not as good as usual. H. D. Davis passed two tests for his *brevet*, right and left-hand circles with their diameter not less than 25 ft. At a meeting held on Saturday evening it was resolved that the annual subscription should be 3s., instead of 4s. as previously arranged.

Ealing Model Aero Club (1, QUEEN'S GARDENS, EALING, W.).

LAST week a little band of model aeroplane enthusiasts living in the Ealing district arranged a small demonstration of models, which was held on Sunday morning. In spite of the high wind prevailing, good flights of up to 300 yards were obtained. Sometimes three models were in the air at the same time. One "rising off the ground" biplane with "staggered" planes rose easily against the wind, but could not turn when once up. As most of the models were experimental, none were consistent in their flights, except one, which was flying well all the morning, though not far. After the flying it was decided to form a club, and enough members were promised to justify its formation. Readers of FLIGHT in this district are asked to communicate with Mr. B. J. Kirchner, as above, who is joint secretary (*pro tem.*), or with Mr. D. C. Line, 53, Grosvenor Road, Hanwell, the other secretary (*pro tem.*). Readers are also asked to turn up, with models, if possible, at a flying meeting to be held at 2.30 p.m. to-day (Saturday) at the field near the crossing of Pitsanger Lane and the continuation of Argyle Road. The footpath to Perivale runs over the field. After this meeting an inaugural meeting of the club will be called, at which the committee will be elected and the rules formed. The club will be exclusively amateur.

Paddington & Districts Ae.C. (133, BUCHANAN Gdns., HARLES DEN)

TO-DAY (Saturday), Mr. Hurlin's lecture on "Details of Model Aeroplane Construction" will be given at 7 p.m. prompt at the Club workshop, situate at Windsor Place, Harrow Road, Paddington. All members are requested to turn up, and anyone interested will be welcomed. Visitors alight from bus or tram at Lock Bridge, nearest Underground station is Royal Oak. This lecture will appeal specially to novices in model aeroplane construction. You cannot make your model fly well, perhaps not at all, then come and hear what Mr. Hurlin has to say!

Members are hard at work on their models in the workshop, and details of some of these are deferred until next week.

A club library has been started, and will be maintained at no expense to the club, containing such books as "Principles of Flight," "Petrol Motors" and "Aero Manual," besides a regular supply of FLIGHT and other periodicals.

Palmer's Green and District Model Ae.C. (15, MOFFAT RD., N.).

INCESSANT rain last Saturday afternoon made flying out of the question. In the evening, however, the club met at its headquarters in Bowes Road to discuss the new year's programme. One or two suggestions were offered with regard to new flying accommodation. It was decided that all members should go exploring and try the suggested grounds.

A series of fortnightly competitions were arranged for distance, duration, steering, point-to-point and rising from the ground respectively. The first of the series, viz., distance, was fixed for January 27th, weather permitting. A distance contest for novices, and members who have not obtained flights of 150 yards, was also arranged.

Suggestions with regard to public demonstrations and the photographer were held over until later in the year.

Will members please note that in future all notices of meetings, competitions, &c., will be given through FLIGHT and not by post card as hitherto.

Putney and Wandsworth Flying.

THERE was a good turn out on Barnes Common on Saturday last, when no fewer than six machines were out, all flying comparatively well. Mr. Hall's model, as usual, showed a liking for the football ground, landing in it many times after its height and duration flights. J. Smith ended the day by flying his machine about 400 yards, it disappearing over the roof of an adjoining house and could not be found. Should anybody interested find it will they please return it to 3, Grove Cottages? On Christmas Day Mr. Hall and J. Smith journeyed over to Mitcham Common to compete in the Croydon and D.A. Club's competition. Mr. Hall's well-known

ounger caused a sensation by its buoyancy and duration in the strong wind, and the knocking about it received speaks well for its construction. The longest flight was performed by J. Smith's model, it flying on one occasion $\frac{1}{2}$ of a mile in a straight line, and was perfectly stable, although the main plane had an inverted dihedral.

Will the gentleman who took Mr. Hall's photograph launching his model please communicate as above, as Mr. Hall would like to purchase some of same?

Scottish Ae.S. (Model Aero Club) (6, McLELLAN ST., GOVAN).

THE members of the club brought in the New Year with a most successful flying meeting, held on the 1st inst. at Barrhead aerodrome. There was a fine attendance, considering the unseasonable weather. Owing to the wind, which at times was about 30 to 40 miles per hour, long-distance flying was the order of the day. The best results are as follows: Mr. J. S. Gordon, 2,006 ft., duration, 50 seconds; Mr. Langlands, 1,370 ft., duration, 38 seconds; Mr. J. C. Balden, 902 ft., duration, 30 seconds.

Mr. Langlands, who is now the second member to top the quarter mile, had hard luck, as his machine showed an annoying tendency to waltz round and round during its fine flight.

Mr. Gordon, who revels in gales and hurricanes, was flying throughout the whole day without a hitch, and did the "quarter" on several occasions. Other good flights were made by Messrs. Donaldson, Mills, Cameron, and Boyd.

On Saturday the 6th inst. a meeting was held at Ibrox which was largely attended by both members and spectators. There were no official results taken, but the display was exceedingly fine nevertheless. Mr. Boyd's low-powered model took first place in duration with 50 secs. on 4 strands $\frac{1}{8}$ -in. strip with 7-in. propellers. Mr. Graham's model went in for altitude, and Mr. Langland's model flew with its usual efficiency. Mr. Balden had some exciting adventures. His model was first caught in the telegraph wires and later on was lost to sight, the landing place being a considerable distance from the starting line. Mr. Gordon's "Blue Bird," the main plane of which is 14 months' old, made some decent circuits and also some fine illuminated flights in the evening.

The next lecture will be given in the Institute, Elmbank Crescent, Glasgow, on Friday the 20th, when Mr. Langlands will entertain the company on a suitable subject on models. A discussion will follow.

A flying meeting will be held at Ibrox to-day (Saturday), and all interested are invited. Members are kindly requested to keep February the 8th open as this is the date of the annual smoking concert in the Lansdowne Restaurant, Hope Street, Glasgow.

Stony Stratford & District Kite & Model Ae.C. (OLD STRATFORD)

THE next meeting will be held on January 18th, at 8 p.m., at the clubroom, when Mr. R. W. Field (the chairman of the club) has kindly promised an address entitled "The Aero Model," and as Mr. Field is one of the members who has taken up this hobby for three years it should prove very interesting. Mr. C. L. Matson, who has been constructing a one-ounger, had this machine out for its tuning-up trials on Christmas and Boxing Days, when he several times obtained flights of 150 yds. and 25 secs. duration. This machine is of the usual I-I-P-O type, and the owner reports it will probably, with careful tuning-up, do the 200 yds. easily. Most of the other members are busily designing or building machines, and reports are to hand of 2 or 3 Mann-type, and 1 biplane, and 1 tandem monoplane upon the stocks.

The secretary wishes to heartily endorse and thank the Bootle and District Aero Club for their kindly appreciation.

Worcester Model Aero Club (VICTORIA INSTITUTE, WORCESTER).

THE first competition of the club took place on January 6th on the club ground. The weather had been very wet all the morning right up to the commencement of flying when the rain was succeeded by a slight mist.

In spite of these bad conditions, however, seven machines turned out, and some good flights resulted.

Three competitions were decided—(a) distance, (b) duration, and (c) stability, with the following results:—Distance: Mr. Pollard 56 yards, Mr. Sears 52 yards, Mr. Davis 34 yards; duration: Mr. Pollard 15 secs., Mr. Sears 11 secs., Mr. Davis 8 secs.; stability: Mr. Davis 10 marks, Mr. Sears 8 marks, Mr. Pollard 5 marks.

To-day (Saturday) further events will be decided in efficiency and direction; the latter will take the form of a point-to-point race.

The secretary will be pleased to welcome new members at any of the meetings. The subscription of 6d. per month admits to all meetings, and also to participation in ordinary competitions.

Yorkshire Ae.C. (Model Section) (5A, HULLAND ST., LEEDS).

OWING to the fearful state of the weather on Saturday last, the exhibition meet arranged to take place in East End Park, was postponed till to-day, Saturday, January 13th. Members please note and turn up in full force.

CORRESPONDENCE

*** The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.*

Correspondents communicating with regard to letters which have appeared in FLIGHT, would much facilitate ready reference by quoting the number of each letter.

Natural Stability.

[1462] In view of the correspondence on the above subject, which has been recently appearing in your columns, the enclosed photograph may, perhaps, be of interest, as showing that the "triangular duct" was introduced between the dihedral planes on one of the hydro-aeroplanes, which I, in conjunction with Mr. F. L. Rawson, made and experimented with at the Isle of Wight.

The machine rested on the water on light pontoons 26 ft. long,

taught. May I recommend the new French Field Artillery Training to his notice. I think it quite possible that in the near future the "Universal shell," and shrapnel, with high explosive head, will take its place.

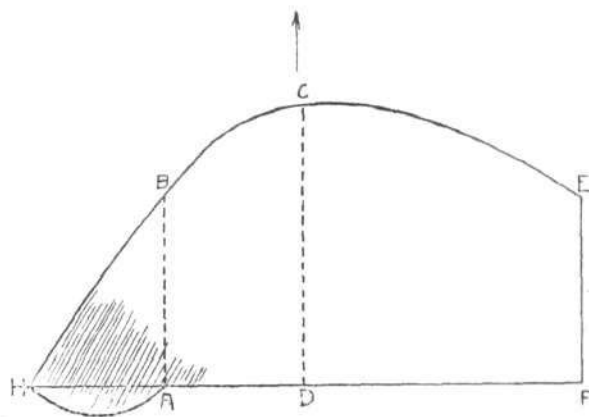
I cannot follow Mr. Hambling into other questions, it would be mere waste of your space. It seems hardly worth while to protest against ideas he attributes to me without the slightest reason. I may, perhaps, ask how he reconciles his statement that a gun, which must weigh complete from 25 to 30 cwt., is "slightly heavier" than a machine gun weighing complete from 50 to 150 lbs.

His statement that my opinion is at variance with all other expert opinion is the merest nonsense.

R. A. (retired).

Wing Form.

[1464] Having noticed the letter of F. A. G. N. (1434), I should like to point out that the principle of the Weiss and similar wings is to make the centre of pressure move through as wide a range as possible for any change in velocity. Automatic stability can never



and weighing only 20 lbs. each, and in addition to the dihedral wings, had on each side two main horizontal planes in front and two at the rear, all moveable. Total lifting and bearing surface = 1,200 sq. ft.

Two vertical fixed planes and a small flying jib were placed in the bows to assist the action of the rudder in the stern.

The engine and 7 ft. propeller was arranged for on the steering deck, which was low down on the pontoons just behind the main planes.

The photo., which is somewhat faded, shows the machine just being lifted out of the water after a trial on the open sea on September 26th, 1905.

London Wall Buildings, E.C.

F. ALEX. BARTON.

The Aeroplane in War.

[1463] I see that Mr. Hambling, in letter 1453, makes further demands on my patience. His suggestion for a gun to fire an effective shell is impossible, as I have already shown, quite apart from the question of whether it would be possible to hit anything or not. The gun with its mounting must weigh some 12 cwt., and 100 rounds of ammunition would weigh rather more, so there is a weight of from 25 to 30 cwt., which no aeroplane yet built could carry in addition to necessary weights.

Again, he talks of his suggested shell opening "on impact," which implies that he intends to use a percussion fuze, if there is any meaning in language. But there is no gunner in Europe mad enough to suggest engaging aeroplanes with percussion shell for obvious reasons!

I have never dreamt of comparing a bomb tube with a gun. They are weapons of a totally different nature. The tube is needed to guide the bomb clear of the wheels and skids of the machine, as, of course, its fuze has to be set in action before it is launched. The gun is impossible at present because of its weight, the machine-gun and bomb tube are quite possible. Bombs have already been used in war, machine guns are being mounted in the new Zeppelin, and will soon be mounted in all air vessels, except the lightest scouts, unless I am very much mistaken.

Mr. Hambling sneers at shrapnel, and he is surely unaware that it is the shell which all modern artillerists use against aeroplanes, and that regular systems of fire have been worked out, and are now

exist in a plane which has a fixed centre of pressure. If the machine is properly balanced, and it dips, it is obvious that no righting moment can be introduced unless the centre of pressure moves.

The matter of the design of wings of the Weiss and other similar types is one of some complication. There is one fact of no little importance, which should be remembered, that is, the travel of the centre of pressure on a plane with the maximum camber near the entering edge is greater than on a plane whose cross-section is the arc of a circle, assuming the change of velocity to be equal in both cases. The negative tips are to give a longitudinal dihedral as well as to provide lateral stability. The sketch shows in half-plan view a type of wing with which I have had great success. This type of plane is very highly efficient as a lifting surface. Both longitudinal and lateral stability are excellent. The chord at the root is two-thirds of that on C D. The shading indicates the portion which is given a negative angle.

If F. A. G. N. is interested, I should have much pleasure in demonstrating some gliders, and lending any assistance possible, should he decide to make the change mentioned, which I think would be an improvement.

With regard to the formula, that of Joesseland Avanzini, I think, satisfies F. A. G. N.'s requirements— $\Delta = \frac{3}{4}(1 - \sin \alpha)L$.

Where Δ is the distance from the centre of pressure to the centre of area, L is the width of the plane, α the angle of inclination.

I am afraid a full explanation of my statements would be impossible in a reasonable space, but if F. A. G. N. desires any points explained I should be delighted to do so.

Bedford Park, W.

S. C. SHEPLEY PART.

Banking.

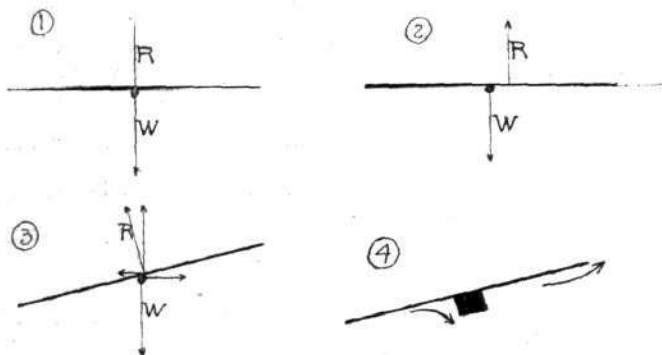
[1465] I see, in letter 1440, a suggestion for obviating "banking" in an aeroplane. But is "banking" a disadvantage? It seems to me that an aeroplane could not turn unless it banked to a greater or less extent.

If we take the case of an aeroplane flying in still air we have it acted on by two forces, its weight, W, (Fig. 1) and the reaction of the air, R. These will be equal and opposite if it is neither ascending or descending.

If the aeroplane is forced by the rudder to describe an arc of a circle, the outer wing will lift more than the inner, and, therefore,

the resultant reaction, R, (Fig. 2) will be nearer the outer wing. W and R will rotate the aeroplane till W and the vertical component of R are in a line.

The horizontal component of R must be equal, and opposite to the centrifugal force (Fig. 3) caused by the circular motion of the



A. KEITH GIBSON

aeroplane. If there were no banking there would be no component of R to counteract the centrifugal force, and the aeroplane would tend to slide along in a straight line.

It will be noticed that R in turning a corner must be greater than R for going in a straight line. Also it is evident that the horizontal forces form a couple tending to "bank" the machine still more.

If the horizontal component of R is less than the centrifugal force the machine will slide outwards, and the planes, acting as a single plane of aspect ratio, $\frac{1}{2}$ or so, will lift more on the outside.

Probably when an aeroplane is tilted the difference in lift of the two planes is not so great as might be expected, owing to the fact that although the outer is going faster there will be a large loss due to air spewing out at the end of the wing (Fig. 4).

If the rudder is mounted centrally at the tail of the fuselage, there is no force to start the "banking." Of course, if there is a dihedral angle the sliding of the aeroplane to the outside of the curve, in an endeavour to go in a straight line, would start "banking."

But if banking is not wanted why not fit a tail rudder which projected above the fuselage? This, in conjunction with an enclosed fuselage, should produce a couple, tending to keep down banking.

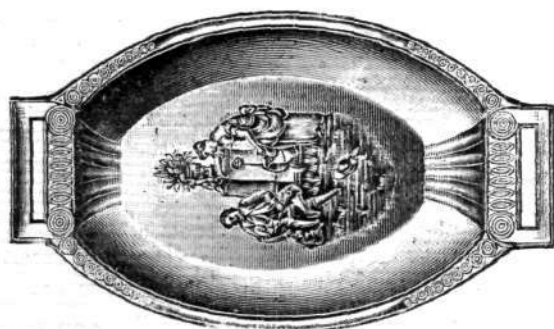
Perhaps some aviator will come forward and say whether a machine banks itself, and if so, whether too much or not enough.

Eskbank.

A. KEITH GIBSON.

A New Firm.

MESSRS. MANN AND GRIMMER inform us that they have now taken over their model business from Messrs. Willis Brothers and have acquired premises and plant at 15, Arlington Road, Surbiton, so that every individual model may be made and tested under their personal supervision. They are also able, by an arrangement with a well known firm, to do business in almost any branch of full size work, a special feature being passenger flights and demonstrations. It is hoped to construct a full-sized Mann monoplane in the near future and the firm is making a speciality of building scale models for inventors. Incidentally they mention that the Committee of the Brighton Aero Club have now officially recognised the flight made a little time back by Mr. H. W. Willis with a Mann monoplane as 100 seconds. The firm are also organising an Agency scheme as well as a prize competition, particulars of which will be found in our advertisement columns.



Sketch of the useful and artistic aluminium fruit dish which formed the practical New Year's card from Mr. Robert W. Coan. Apart from its utility, the dish is a very fine example of clean casting in this light metal, in which Mr. Coan specialises with such conspicuous success.

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	Imports.		Exports.		Re-Exportation.	
	1910.	1911.	1910.	1911.	1910.	1911.
	£	£	£	£	£	£
January ...	2,516	1,196	750	1,088	550	Nil
February ...	437	3,129	2,950	1,786	—	—
March ...	7,516	11,327	128	1,027	600	357
April ...	6,305	2,110	950	807	1,470	4,343
May ...	846	1,707	400	2,471	350	1,972
June ...	7,961	3,225	642	2,432	558	1,682
July ...	11,608	9,822	336	2,256	830	643
August ...	6,188	2,873	812	2,153	1,455	265
September ...	1,034	1,839	4,340	1,183	1,668	—
October ...	2,816	4,727	670	701	2,211	400
November ...	3,941	1,785	251	1,440	1,655	360
December ...	5,038	690	3,257	1,129	850	—
	56,206	44,430	15,486	18,473	12,197	10,022

PUBLICATIONS RECEIVED.

Der Maschinenflug. By Jos. Hofmann. Frankfurt: F. B. Auffarth. Price 6 marks.

The Helicopter Flying Machine. By A. Robertson Porter, A.M.I.C.E. London: Offices of Aeronautics, 3, London Wall Buildings, E.C. Price 3s. 6d. net.

Aeronautical Patents Published.

Applied for in 1910.

Published January 11th, 1912.

29,874. A. E., H. L., AND H. O. SHORT. Atmospheric pressure indicator.

30,139. N. DE BENOIS. Flying machines.

Applied for in 1911.

Published January 11th, 1912.

8,398. SIR W. E. J. VAVASOUR. Aerial machines.

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